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How did the Turkish Industry Respond to Increased Competitive Pressures, 1998-2007?

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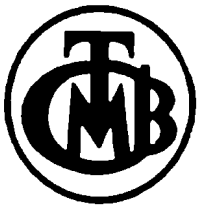

HOW DID THE TURKISH INDUSTRY RESPOND TO INCREASED COMPETITIVE PRESSURES, 1998-2007?[φ]

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ABSTRACT

This study examines how Turkish manufacturing industry responded to increased competitive pressures that it has faced over the past decade. Pressures arose both from growing trade competition from low-cost countries which have similar trade specialisation patterns to Turkey's, and from strong trend real currency appreciation that Turkey has experienced during this period. In response, Turkish manufacturers increased their productivity, differentiated products, moderated wage growth and drew on declining capital and imported input costs. The study provides a detailed statistical analysis of these avenues of response, and the contribution they brought to the competitive margins of the manufacturing industry. It shows that while the structurally strong sectors of the economy made successful use of these avenues, the less sophisticated and lower-technology activities using low-skilled labour and low-price local inputs could not fully cope, and lost ground. The latter sectors' still large weight in total manufacturing output and employment makes their adjustment a persisting challenge for the Turkish economy.

Keywords: Turkey, trade, competitiveness, clustering in sectors.

***JEL Classification*:** L1, L6, O5, L16, L25

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How did the Turkish Industry Respond to Increased Competitive Pressures, 1998-2007?

1. Introduction

Turkey has faced serious trade competition from low-cost emerging countries through the last decade, together with substantial exchange-rate fluctuations. Trendwise, the lira appreciated significantly in real terms in the post-2001 macroeconomic stabilisation and strong growth period, and this compounded competitiveness challenges. To what extent these developments were successfully coped with by the Turkish industry, or if on the contrary they have put excessive pressures on the supply side of the economy generating serious output and employment costs is hotly debated.

Our study presents a thorough quantitative analysis to inform this debate. It proposes *new measurements of competitiveness* for the manufacturing industry as a whole and for several of its sub-sectors -- through model-based estimators of annual profit margins. It analyses to what degree, and through which channels profit margins of trade-exposed industries have changed over the past decade. As firms do not passively absorb the impacts of low-cost country competition and exchange rate pressures on their prices and margins, and respond by raising productivity, moderating wages, and differentiating products, these responses are identified and documented. The respective influences of these avenues of response on the evolution of profit margins have been quantitatively estimated.

Outcomes under two different exchange rate regimes have been analysed: the fixed exchange rate regime between 1998-2001, and the floating exchange-rate regime after 2001. The paper focuses more on the evolution of competitiveness under the floating exchange-rate regime, which now represents the normal exchange-rate environment for the Turkish economy.

The next section exposes the standard measurement of Turkey's competitiveness during this period with the traditional method based on *unit labour costs*, and discusses its shortcomings in the Turkish environment. It then introduces the analytical extension utilised in this project for estimating mark-ups on a more complete basis, accounting for a wider set of determinants than unit labour costs. The following two sections present the findings of the project on the evolution of competitiveness and its main determinants for the manufacturing industry as a whole and for 15 of its sub-sectors.

2. Measuring Turkey's competitiveness

2.a Standard measurement of competitiveness and its shortcomings in Turkey

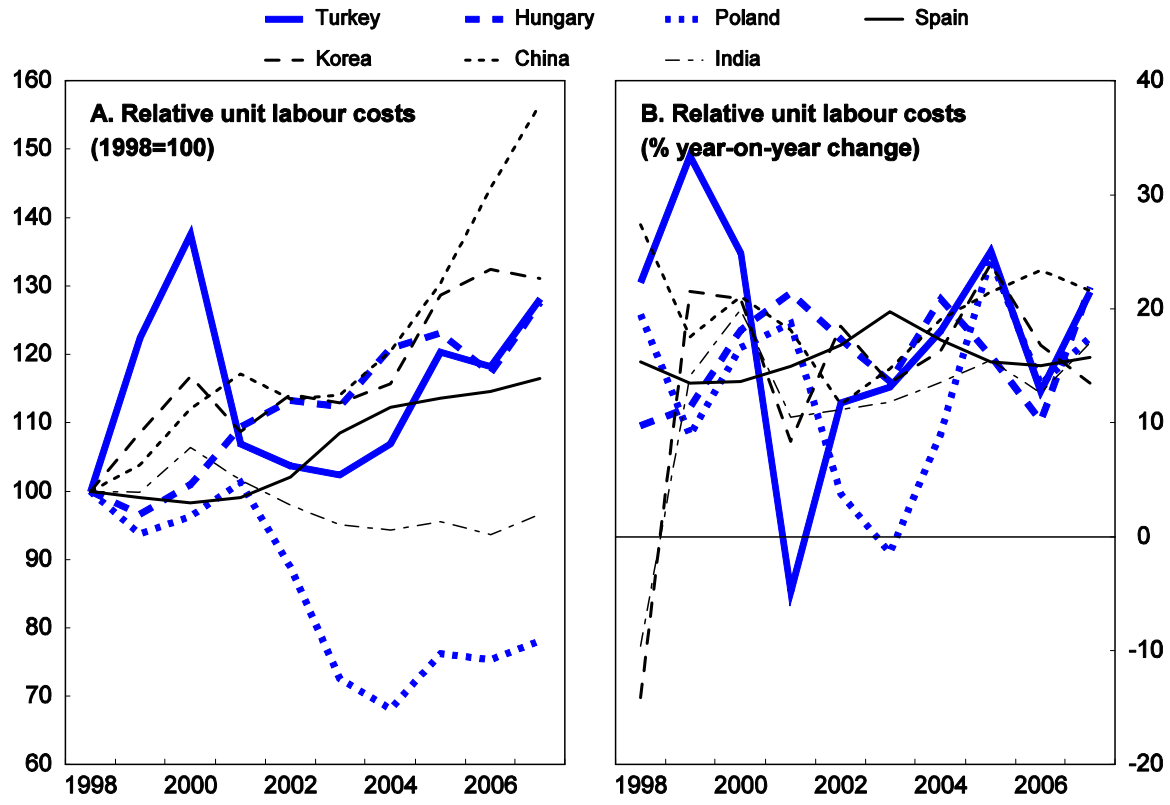
In standard economic analysis competitiveness is measured through relative unit labour costs.[1] This measure permits to gauge the evolution of producers' profit margins through the combined variation of *domestic nominal unit labour costs* and *exchange rates*. The measurement assumes that manufacturers from all countries face the same international market prices, in level or at least in rate of change.

Unit labour costs are seen as the most important and discriminating determinant of competitiveness for national industries, as national wage and productivity levels vary highly across countries, both in level and in direction of change. Other production factors, such as capital, energy and raw materials are considered to be traded in open markets, with their prices converging and exerting no discriminating impact on national competitiveness and profit margins. On this account, Turkish economy's competitiveness against trade partners has evolved as follows between 1998 and 2007 (Figure 1):

[1] The following sources provide comprehensive presentations of the conventional measurement of competitiveness via unit labour costs: M. Durand, J. Simon and C. Webb (1992); Ph. Turner and J. Van't dack (1993); M. Greiner, Ch. Kask and Ch. Sparks (1995); and K. Lepron and P. Schreyer (1998).

Figure 1. Turkey's competitiveness according to relative unit labour costs

1998 - 2007 (1998 = 100)



Source: OECD Economic Outlook 83 database.

Measuring competitiveness through this standard indicator has, however, important shortcomings in the Turkish context. These shortcomings affect the measurement of competitiveness in all countries but at a degree conventionally considered as not exceedingly distorting for competitive analysis. They prove however particularly relevant in the Turkish environment:

- *Changes in the relative prices of products against international competitors' prices are not accounted for*. The qualitative differentiation of products and the resulting international differentiation of their unit values are not reflected in relative unit labour costs. If exporters from a given country preserve or increase their margins by differentiating their products and raising their prices above international competitors, this will not be captured through relative unit labour costs.

Any resulting underestimation of competitiveness may be significant in Turkey, as manufacturers succeeded to boost the unit values of their products in significant proportions in the 2000s.[2]

- *Relative unit labour costs are available as national averages and any performance divergences across sectors are obfuscated.* If different parts of a national economy diverge too strongly in terms of price pressures faced, and ability to respond to them through product innovations, productivity gains and wage moderation, the average *national* measurements of competitiveness will obfuscate these differences. This risk of *obfuscation by aggregation* is particularly serious in Turkey, as competitive performances are less homogenous across sectors, regions and business types than in the other OECD economies. Traditional exporters specialised in low-skilled/low-cost activities face different competitive pressures than the more sophisticated sectors, and perform unevenly in the face of them. *National* averages of competitiveness and profitability – the only available indicators through relative unit labour costs— unavoidably disguise these divergences.

- *Cost components other than unit labour costs bear importantly on competitiveness.* Relative unit labour costs, even if they could be compiled on a price-adjusted basis and at sectoral level, would not fully capture the main determinants of international competitiveness in the case of Turkey. In the countries where the cost of "non-labour" production factors such as capital, energy and other material inputs diverge significantly from international averages, in level and in direction of change, they must be taken into account to gauge manufacturers' relative competitive position.

2.b Two new competitiveness measures developed for this study

Two model-based estimators have been developed to address, at least partly, these concerns in the case of Turkey:

i) A "price adjusted relative unit labour costs" model was used to take into account the impact of the qualitative differentiation of products on competitiveness and profit margins (2.b.1);

ii) An "extended unit costs" model was used to include not only *unit labour*, but also *unit capital*, *unit energy* and *unit input* costs on the measurement of competitiveness and profit margins (2.b.2).

[2] The importance of this competitiveness channel was investigated in a recent study of the trade performance of Central and Eastern European economies between 1994 and 2004. See: Fabrizio S., D. Igan and A. Mody (2007).

The calculation of these two sets of indicators helped draw a more complete picture of Turkey's competitiveness and its main determinants over the past decade, than the more blurred panorama generated with the traditional indicators.

2.b.1 Competitiveness according to price-adjusted unit labour costs

In the first model, the price-making power of producers and their unit labour costs are the two central determinants of competitiveness. Competitiveness is measured as the rate of change of the wedge between *unit prices* and *unit labour costs*. Suppliers' capacity to increase their export and domestic prices by means of product differentiation is therefore taken into consideration. Price-adjusted unit profit margins can be calculated at aggregate manufacturing and individual sub-sector levels.[3]

This model permits to estimate the contribution[4] of individual influences on profit margins. The impact of i) changes in prices, ii) changes in wages and iii) changes in labour productivity can be estimated separately. Changes in prices can be decomposed into a) an *exchange rate impact* (the price change that would take place if prices changed only in accordance with real exchange rate changes); and ii) a *quality mark-up* (estimated as the difference between the hypothetical impact of the real exchange rate change and the actual price change).[5]

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[3] The "export price-adjusted unit labour cost based" competitiveness EPMI is calculated as:
EPMI= EXPr /ULC
With:
EXPr: Index of Real Export Prices in national currency
(EXPr= Export prices/GDP deflator)
ULC: Index of Real Unit Labour Costs in national curency
ULC = (Wn * PWH)/ (IP)
Wn: Index of Real Wages per Worked Hour
PWH: Index of Worked Hours
IP: Index of Industrial Production
The "domestic price-adjusted unit labour cost based" competitiveness DPMI is calculated by replacing export prices EXPr by real domestic producer prices.

[4] To estimate the contributions of individual factors, a logarithmic differentiation of the equation of EPMI was used.

[5] The hypothetical *real exchange rate effect* (xe) and the *quality mark-up* (qe) are estimated as:
xe: d(EXPr(c))/EXPr(c), to calculate EXPr(c), EXPr is kept constant at its 1997 level for the whole analysis period and then multiplied by relevant year's US dollars index (USD) and deflated by GDP deflator, in other words, EXPr(c)= EXPr(1997-2007=100)*(USD/GDP deflator).

qe: d(EXPr)/EXPr)-d(EXPr(c))/EXPr(c)]

2.b.2 Competitiveness according to extended unit costs

The second model captures the influence of *unit capital*, *unit energy* and *unit imported input* costs as additional determinants of competitiveness. Competitiveness is measured as the rate of change of the wedge between unit prices and total unit costs calculated as the weighted sum of individual cost components.[6]

The weight and rate of change of *unit labour*, *unit capital*, *unit energy* and *unit imported input* costs were estimated for the manufacturing industry as a whole and for individual sub-sectors, on the basis of a variety of technical and accounting sources.[7]

As with the previous model, this methodology permits to decompose the contribution of individual components to the evolution of competitiveness for the manufacturing industry as a whole, and for individual sub-sectors.[8]

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6 The "extended model of unit costs" based competitiveness indicator EEPMI is calculated as:
EEPMI= (EXPr) / {a*ULC+b*UCC+ c*UEC+ d*UIM}
EXPr: Real Export Price index
UCC: Index of real interest rates for real sector credits
UEC: Index of real unit energy costs
UIM: Index of real imported input costs
a: Coefficient of aggregate/sectoral unit labour costs.
b: Coefficient of aggregate/sectoral unit capital costs.
c: Coefficient of aggregate/sectoral unit energy costs.
d: Coefficient of sectoral imported input costs.

7 Including Turkish Statistical Institute's various input-output tables, and The Central Bank of Turkey's corporate balance sheet data.

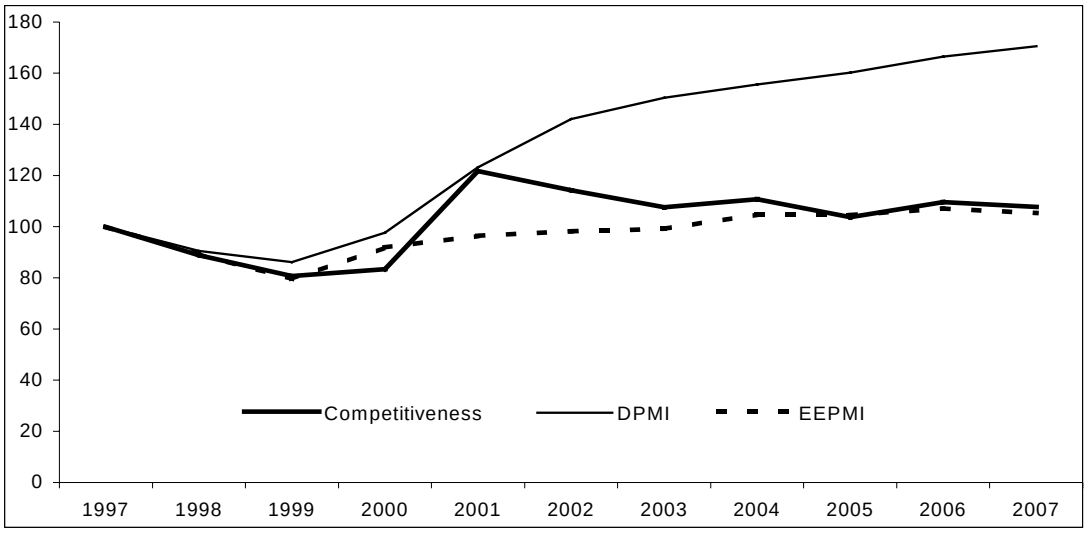
8 The contributions of unit labour costs (ULC), unit capital costs (UCC), unit energy costs (UEC) and unit imported input costs are calculated as:
Contribution of relevant unit cost (C): {[e(t+1)*C(t+1)]- [e(t)*C(t)]}/(EXPr)
With:
"e"designates the coefficient of relevant cost factor and "t" denotes year.

3. Turkish manufacturing industry's competitiveness and its determinants, 1998-2007

3.a Four periods in the competitiveness of the manufacturing industry

On the basis of these measurements, four phases are distinguished in the evolution of Turkey's competitiveness (Figure 2).

Figure 2 - Competitiveness of the manufacturing industry, 1997-2007 (1997=100)



Source: SIS and own calculations.

First period: There was a regular and gradual erosion of competitiveness between 1997-2000, prior to the 2001 currency crisis.

Second period: Competitiveness was suddenly restored in 2001, due to sharp currency depreciation and real wage declines (following the inflation acceleration and open unemployment which occurred during the crisis).

Third period: 2002-2006 was a period of normalization during which competitiveness either improved or worsened but always in in limited proportions, in line with currency depreciations and appreciations. Depreciations arose from turbulences in global markets and have been of short duration.

Forth period: 2007 was a year a squeeze started on competitiveness. Strong pressures resulted from a combination of large inflation differential with trade partners, and nominal currency appreciation.

In the 1997-2007 period as a whole, Turkey's cumulative competitive position in international and domestic markets evolved as follows:

i) *Price-adjusted unit labour costs* indicate a relative stability in the export profitability of the manufacturing industry as a whole. Unit profit margins declined at the end of 2007 only to their 1997 level. The upturn in margins achieved in 2001 provided a hefty buffer that the economy could use until the end of 2007.

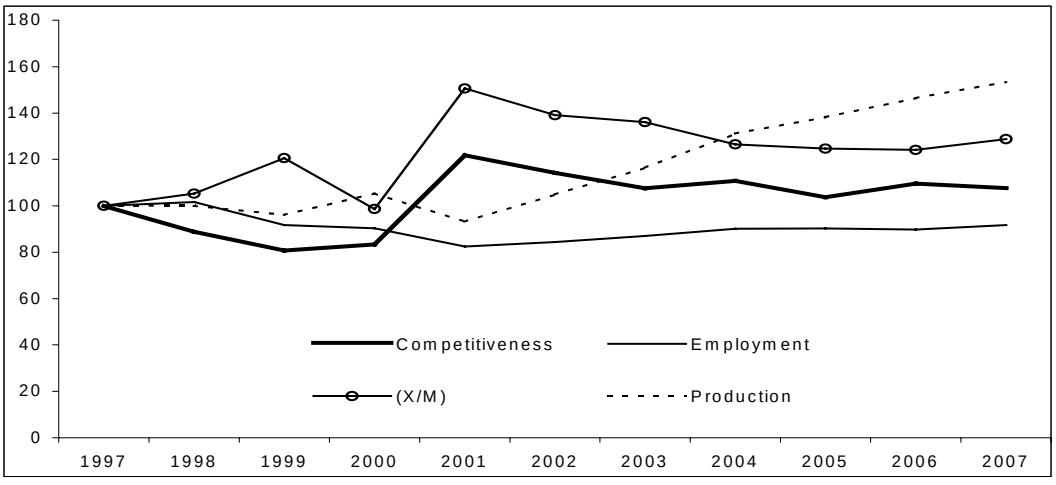
ii) This buffer was entirely exhausted at the end of 2007, as a result of rising competition from low-cost countries and trend currency appreciation. Any additional competitiveness losses would have to be absorbed by income cuts for all factors of production.

iii) Manufacturers' profit margins in the domestic market were less squeezed in the 2000s than in the international markets. Turkish manufacturers drew on a "local market power" to adjust their domestic prices less than export prices.

iv) This price shelter was ephemeral. In certain years, and notably in 2007, domestic and export prices evolved in parallel. This reflected increasing integration between domestic and external markets and reduced the extra profit margins associated with domestic sales.

These evolutions in manufacturing sector's competitiveness reflected on the manufacturing trade balance ((export (x) over import (m) ratio)) and, to a lesser extent, on the employment performance of the economy during 1998-2007 (Figure 3). The relationship between competitiveness and employment is more evident at the level of individual industries as reviewed in Section 4.

Figure 3 – Trade balance and employment in manufacturing, 1998-2007 (1997=100)



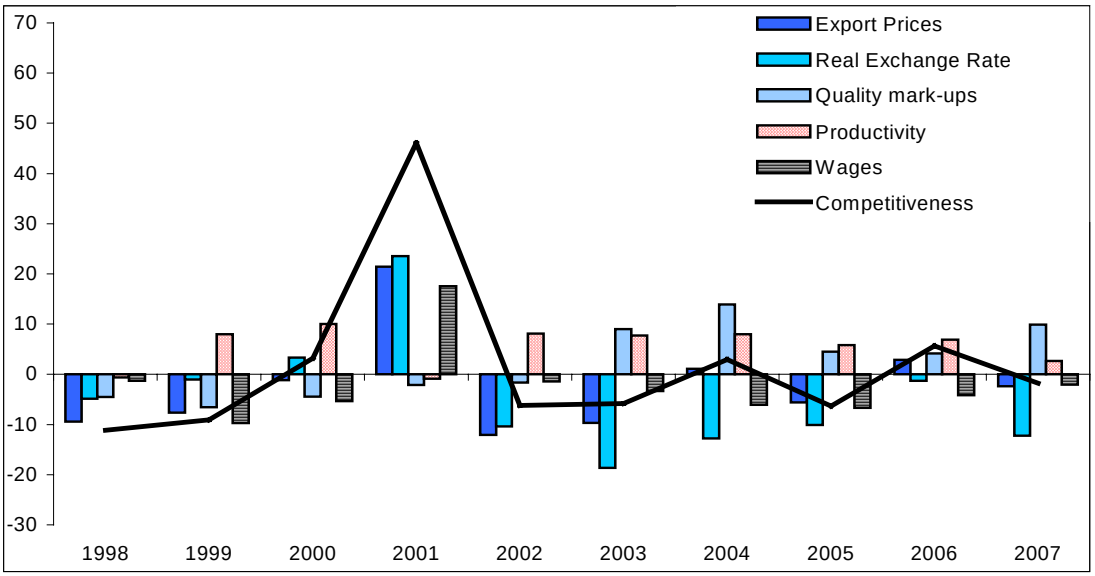
Source: SIS and own calculations.

3.b Sources of competitiveness: insights from price-adjusted unit labour costs

The decomposition of individual factors, which contributed to the variation of price-adjusted unit labour, costs between 1998-2007 gives the following insights (Figures 4 and 5):

Figure 4 – Sources of unit labour cost-based competitiveness, 1998-2007

Percentage change in unit labour cost based competitiveness and estimated contributions of prices, real exchange rate, quality mark-ups, productivity and wages



Source: SIS and own calculations.

i) *Changes in exchange rates* have been crucial. They had the highest variance among all factors and the highest impact on estimated competitiveness and profit margins. Competitiveness eroded sharply in periods of real currency appreciation and recovered in periods of real currency depreciation.

ii) Exchange rates were by no means the unique determinant of competitiveness. *Changes in the unit value of products* (quality mark-ups) played also a significant role. Two periods should be distinguished in the evolution of these mark-ups:

– Until 2002, mark-ups on export prices have been “negative”, that is to say export prices increased less than predicted by our model. This can be interpreted as exporters’ being unable to resist the international price declines imposed by competitors;

– From 2002 on, the situation reversed. Exporters managed to set prices above international prices. Differentiating products and increasing their unit value started to become a widespread response of manufacturers to international price competition;

iii) Labour productivity gains brought a major positive contribution throughout the period, which has further accelerated after 2001.

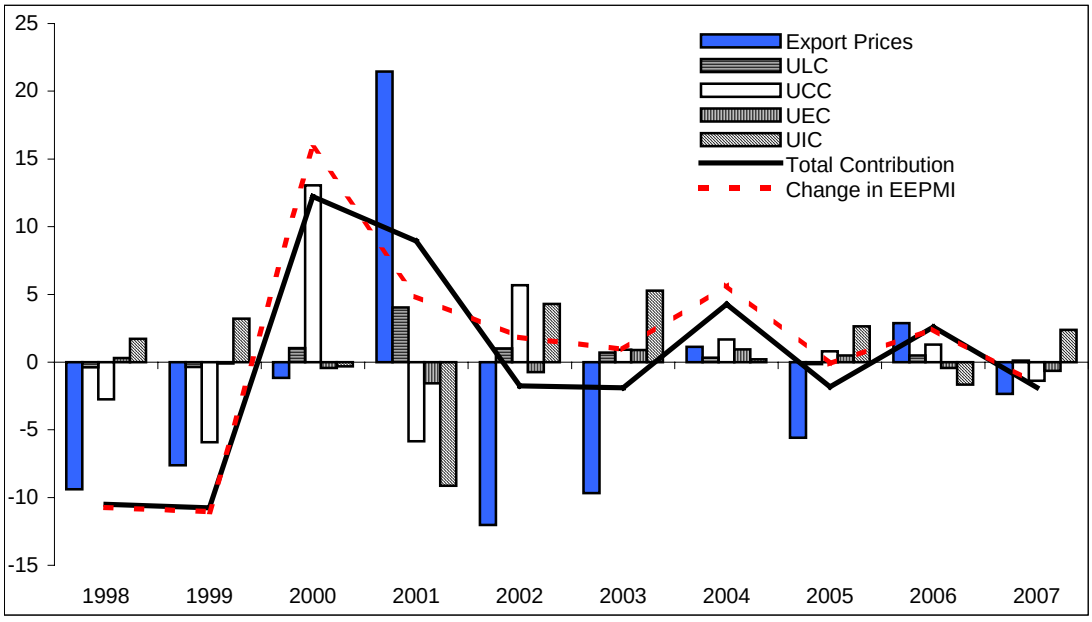
iv) Real wages' staying below productivity growth -- except at the occasion of the strong increase in minimum wages in 2004-- also supported competitiveness.

3.c Sources of competitiveness: insights from extended unit costs

When the evolution of profit margins is measured by taking into account the full range of cost factors, the competitiveness of manufacturing appears less squeezed between 1998-2007. For the industry as a whole, estimated margins on export sales in 2007 were 20% above their 1998 level (Figure 5).

Figure 5 – Sources of total unit costs-based competitiveness, 1998-2007

Percentage change in total unit costs based competitiveness and estimated contributions of prices, unit labour costs, unit capital costs, unit energy costs, unit imported costs



Source: SIS and own calculations.

The respective contributions of different influences on "extended unit costs-based" competitiveness display the following characteristics:

i) Exchange rate fluctuations maintained their dominant influence on profit margins.

ii) Changes in capital costs also had a major impact. Competitiveness is improved when risk premia and interest rates decline in years of macroeconomic stabilization and confidence building --such as in most of the post-2001 period. Symmetrically, any deterioration in risk premia and interest rates have significant negative effects (as in 2001 and 2006).

iii) Energy costs also affect competitiveness. The regulatory control of electricity prices between 2003-2007 period supported competitiveness (but at high fiscal costs).

iv) Imported input costs also have a tangible impact. They play the role of a "natural hedge" against exchange-rate fluctuations. [9] However, this hedging mechanism operates in the manufacturing industry *as a whole*: it plays a smaller role in sectors using domestic inputs and a larger role in sectors importing a higher proportion of their inputs.

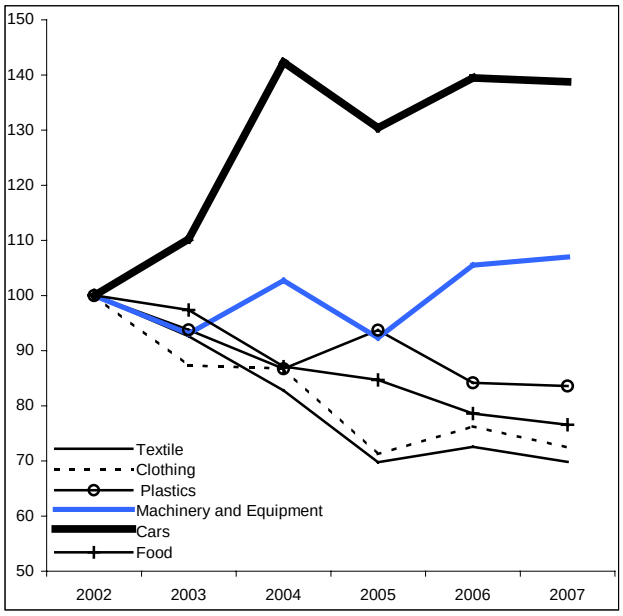
3.d Diverging performances in three clusters of sectors

Manufacturing sectors cluster into three groups in terms of their competitive performances over the past decade. The more capital-intensive, higher technology, sophisticated activities succeeded to improve their margins during the entire period. In contrast, lower technology activities relying on low-skilled labour and low-cost local inputs were generally squeezed. There is also a large intermediary group of sectors that continue to try out various strategies to preserve their competitiveness (Figure 6).

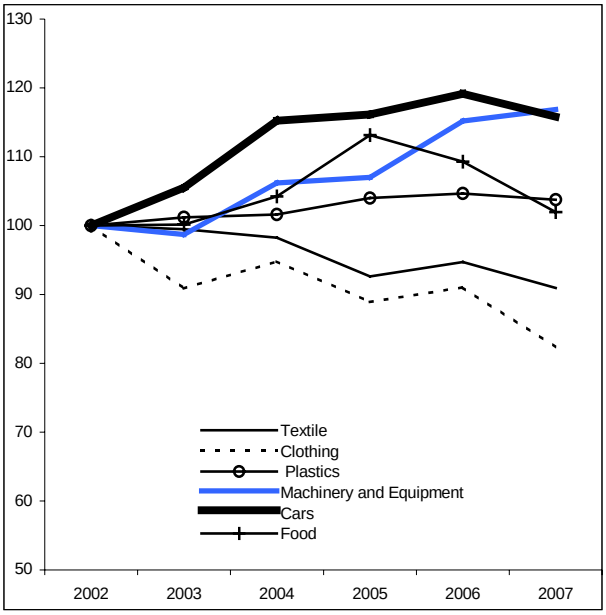
[9] When the exchange rate depreciates, high input costs partly neutralise increases in product prices and when it appreciates prices losses are partly off-set by declining input costs.

Figure 6 – Diverging performances of competitive and declining sectors

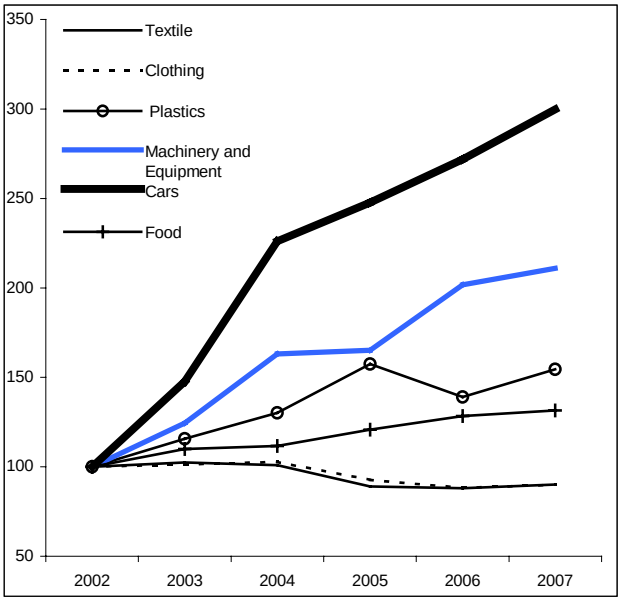
A) Competitiveness (EPMI) (2002=100)



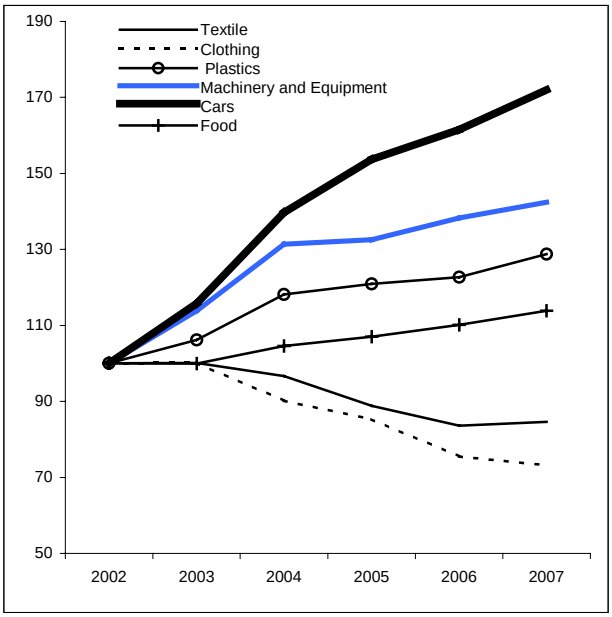
B) Extended EPMI (2002=100)



C) Production (2002=100)



D) Employment (2002=100)



Source: SIS and own calculations.

Well performing sectors

These sectors are made of enterprises which did consistently well along most determinants of competitiveness between 1998-2007. They include car manufacturing, electrical equipment (consumer durables), industrial machinery and equipment, chemicals and steel production. They did better than national averages in productivity growth, succeeded to set wages in line with normal profitability,[10] reduced their capital and input costs, and differentiated their products. On this broad ground they achieved generally remarkable output, export and employment performance.

Squeezed sectors

These sectors under-performed in most dimensions of competitiveness. The traditional specialisation areas of the Turkish industry drawing on low-skilled labour and low-cost local inputs generally faced this situation. They include notably the textiles and clothing industry, which represent together about one third of Turkey's total manufacturing output and employment. The majority of firms in these sectors failed to increase their productivity, moderate their wages and differentiate their products at a sufficient pace to preserve their competitiveness. Their output, export and employment performance declined significantly as a result.

Sectors in an intermediary situation

A large group of sectors were in an intermediary situation. They experienced varying paces of price pressures, productivity, and wage growth. Gains on capital and input costs were generally significant but not large enough to neutralise pressures on competitiveness. The manufacture of electronic goods (radio, TV and communications equipment), furniture, plastics and food products have been in this category. Their output, export and employment performance remained generally average.

When extended unit costs are taken into account this clustering becomes even more evident:

[10] In these more sophisticated industries, wage moderation reflected the flexibility of wage agreements. This was in contrast with the rigidity of wage costs in less sophisticated industries, mainly as a result of political decisions on mandatory minimum wages. See *OECD Economic Survey of Turkey*, 2006.

- The most competitive industries on a unit labour cost basis being also the most capital- and imported-input intensive ones, they benefited more from declining capital and imported input costs after 2001;

- Low-technology activities benefited less from these factors. Yet they are also becoming more capital intensive, and import a higher share of their inputs. However, the resulting gains from the positive macroeconomic developments after 2001 were not large enough to offset the overriding pressures on their competitiveness;

- The three groups of sectors faced a squeeze on their profit margins and competitiveness of an exceptional intensity in 2007: higher interest rates and energy costs compounded the pressures of accelerated currency appreciation.

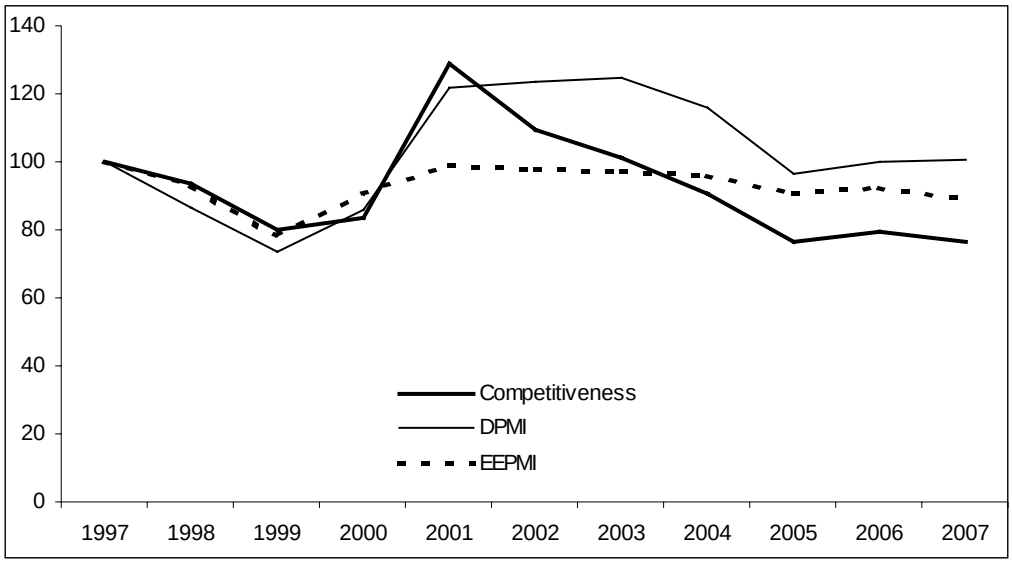
4. The competitive performances of individual sectors[11]

Additional specificities in individual sectors' performances were explored with the help of the above-described indicators. Particularities in *international price pressures*, *productivity gains*, *product differentiation*, *wage growth*, *capital cost changes* and *imported input costs* were taken into account. The relationship between the competitive performance of sectors and their trade and employment performances was examined. This section illustrates the most significant sectoral specificities with the help of a standard set of graphs. Each sector is introduced below with summary remarks highlighting its key specificities.

4.1 Textiles

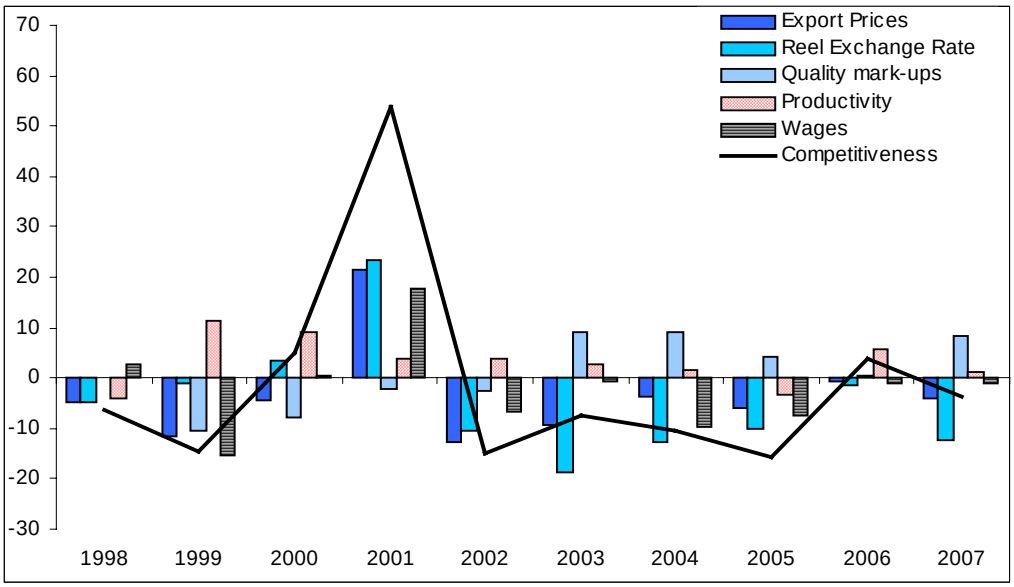
. Textiles are still today one of the two main sectors of trade specialisation of Turkey.[12]
. Between 1998 and 2007, with the exception of a temporary relief due to the 2001 currency depreciation, the sector faced continuous price squeezes and competitiveness losses.
. Pressures were faced not only in export markets, but also in domestic markets.

A) Competitiveness (1997=100)



B) Sources of EPMI

Percentage change in unit labour cost based competitiveness and estimated contributions of prices, real exchange rate, quality mark-ups, productivity and wages



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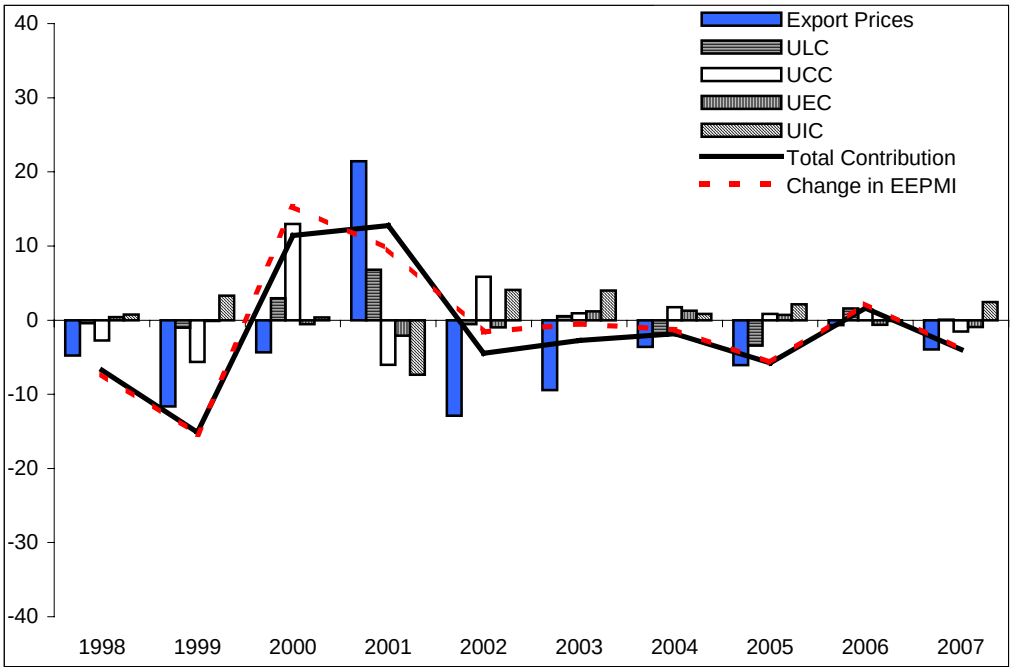
11 Source of all graphs presented in this section is SIS and own calculations.

12 An analysis of Turkey's trade specialisation and revealed comparative advantages (RCA) can be found in the *OECD Economic Survey of Turkey, 2008*.

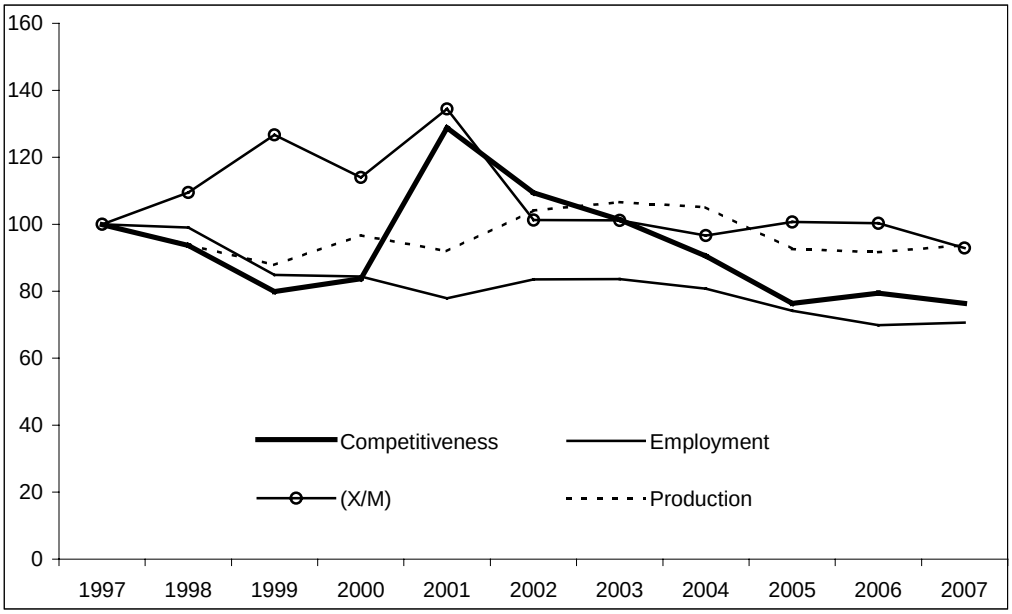
. Wage growth was too high compared to productivity growth, especially following the minimum wage increases decided in 2004.
. Quality mark-ups played a positive role through the 2000s. The decline of capital and imported input costs also contributed positively.
. However, the positive factors offsetting price squeezes helped apparently only a minority of firms and did not suffice to redress the performance of the sector as a whole.

C) Sources of extended EPMI

Percentage change in total unit costs based competitiveness and estimated contributions of prices, unit labour costs, unit capital costs, unit energy costs, unit imported costs



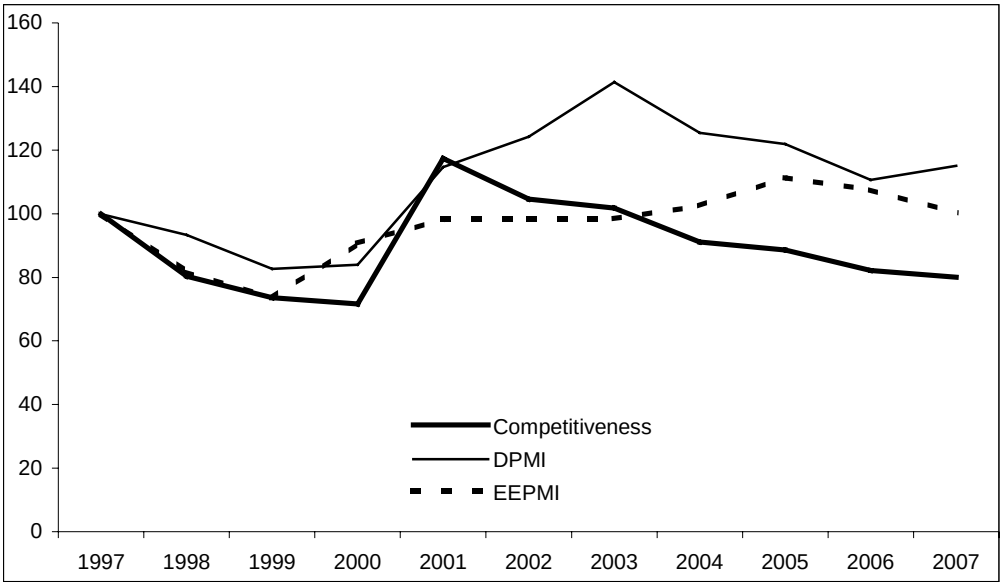
D) Trade balance and employment (1997=100)



4.2 Food products

. Food production is a large manufacturing sector in Turkey, the competitiveness of which is also affected by exogenous factors such as weather fluctuations and trade policies.
. Competitive margins were exposed to pressures between 1998 and 2007, on both international and domestic markets. The domestic market was in general more sheltered from external competition, in particular on certain years such as 2003 and 2007.

A) Competitiveness (1997=100)



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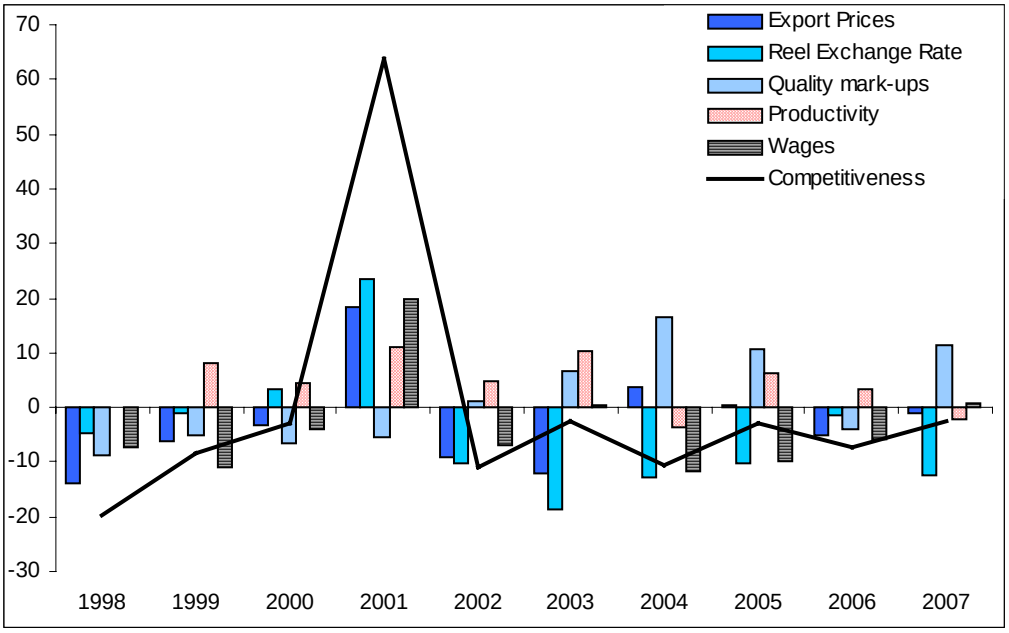
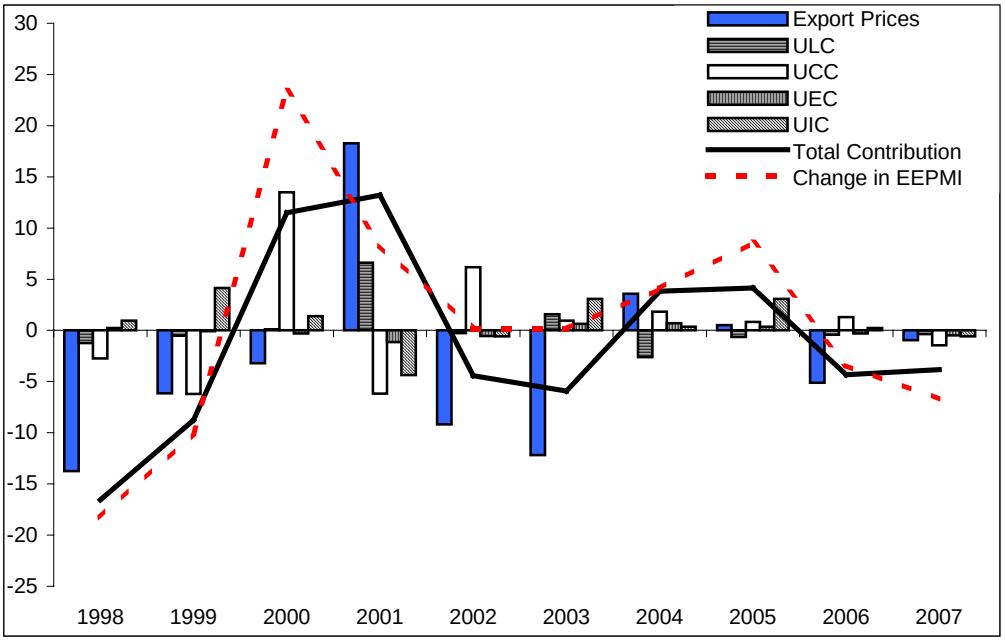
Percentage change in unit labour cost based competitiveness and estimated contributions of prices, real exchange rate, quality mark-ups, productivity and wages



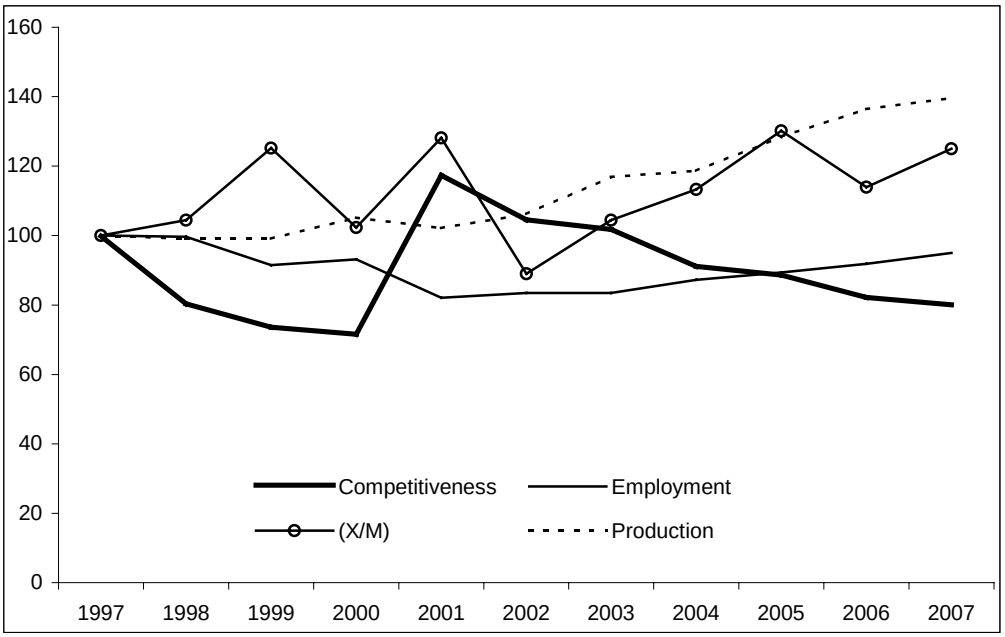
. Turkey's strong endowment with agricultural resources supported the sector only to a limited extent. Technological and commercial gaps in national agriculture apparently reduced such benefits.[13]
. Growing world demand for agricultural and food products improved margins and trade and employment performance in most recent years.

C) Sources of extended EPMI

Percentage change in total unit costs based competitiveness and estimated contributions of prices, unit labour costs, unit capital costs, unit energy costs, unit imported costs



D) Trade balance and employment (1997=100)

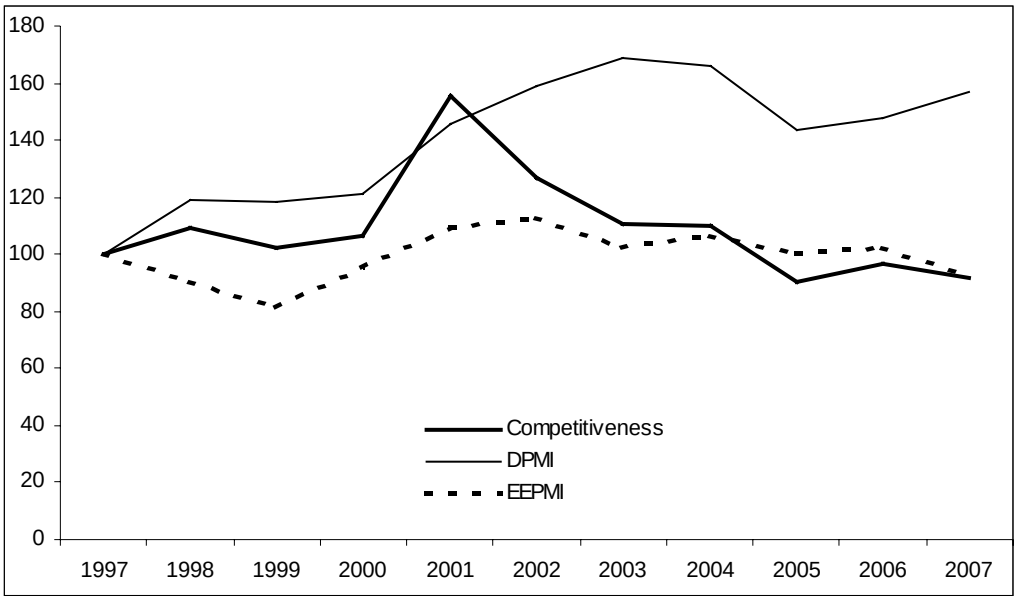


13 An overview of the lags against international competitors was included in the *OECD Economic Survey of Turkey 2006*.

4.3 Clothing

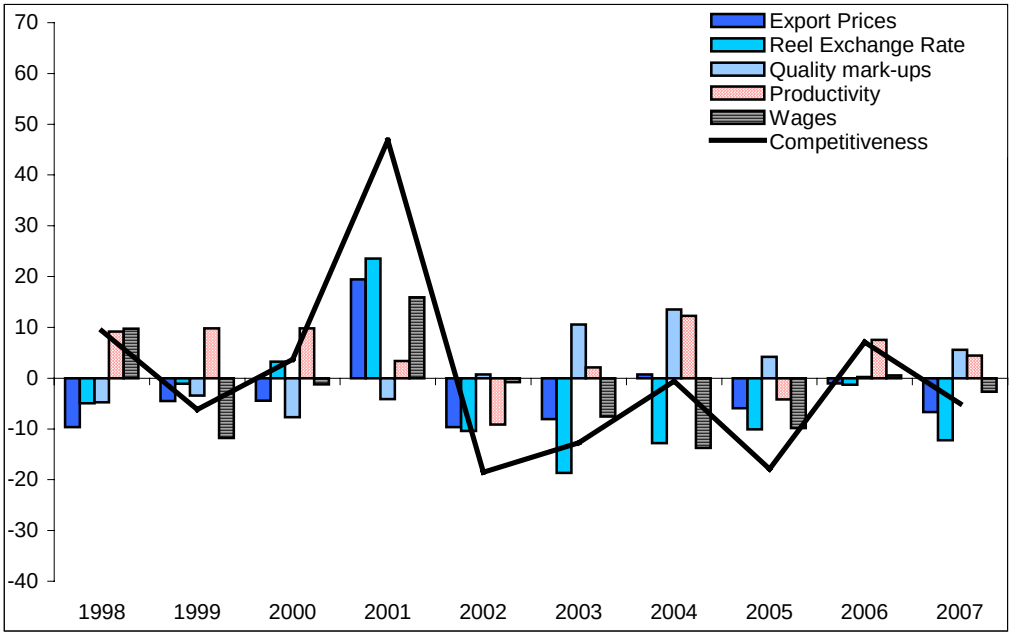
. Together with textiles, clothing is the other major sector of trade specialisation of Turkey.
. Competitiveness of clothing was severely squeezed between 1998-2007. Margins on domestic sales were relatively more protected, possibly with the help of temporary trade protection measures.
. Wage growth was on certain years superior to productivity growth. Impact of declines in capital and imported input costs have been smaller than in other industries.

A) Competitiveness (1997=100)



B) Sources of EPMI

Percentage change in unit labour cost based competitiveness and estimated contributions of prices, real exchange rate, quality mark-ups, productivity and wages

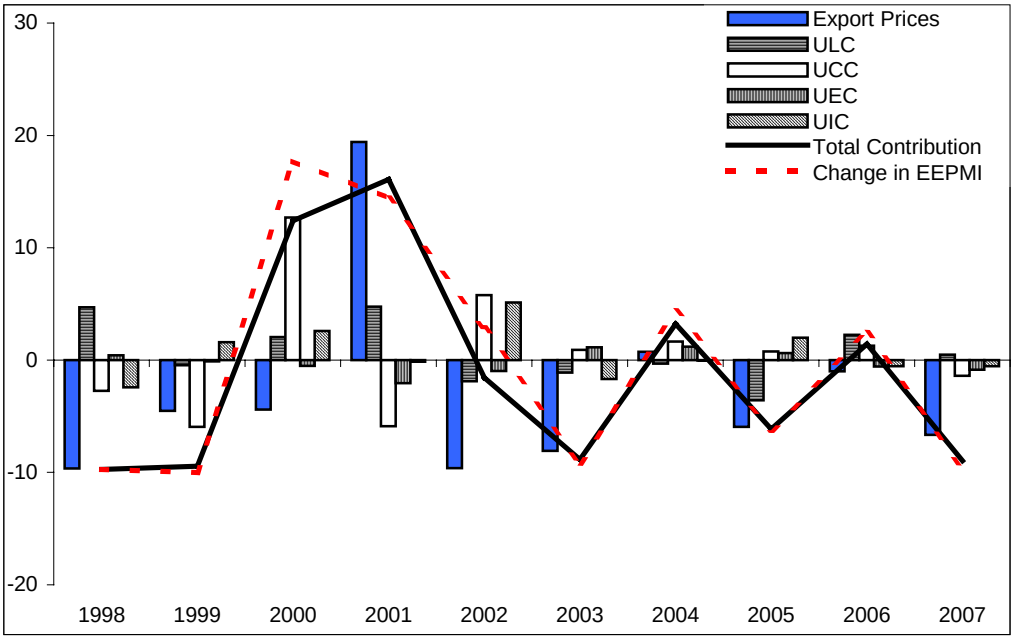


. The largest part of output being exported, trade protection was of limited relevance for the performance of the sector. Only successful diffusion of upgrading strategies could help the sector recover the ground lost to price competition.

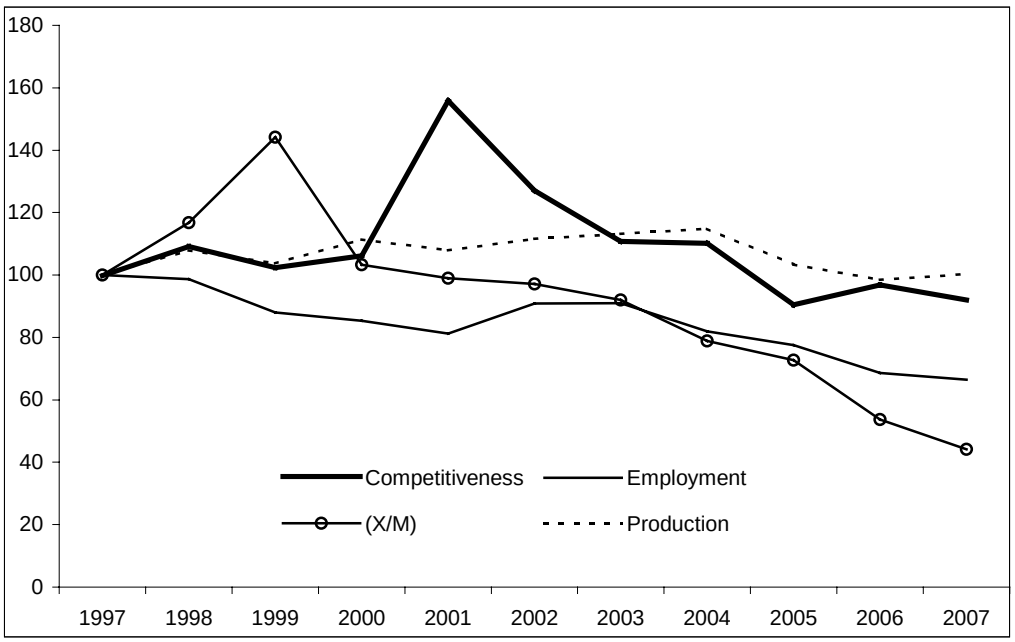
. The quality of products improved recently but these strategies have not yet spread at a sufficient pace to redress the aggregate trade and employment balances of the sector.

C) Sources of extended EPMI

Percentage change in total unit costs based competitiveness and estimated contributions of prices, unit labour costs, unit capital costs, unit energy costs, unit imported costs



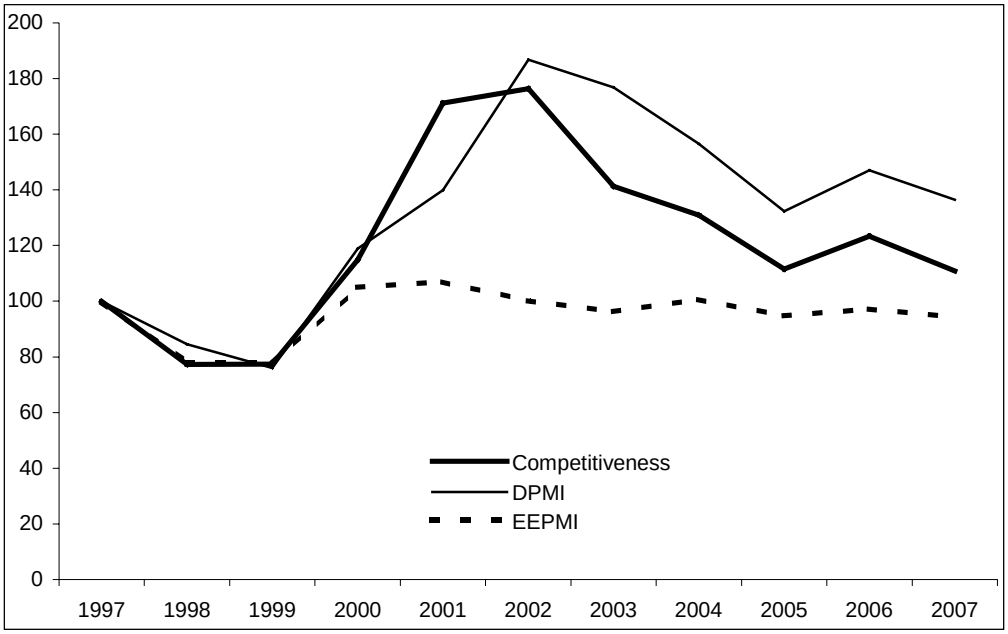
D) Trade balance and employment (1997=100)



4.4 Leather industry

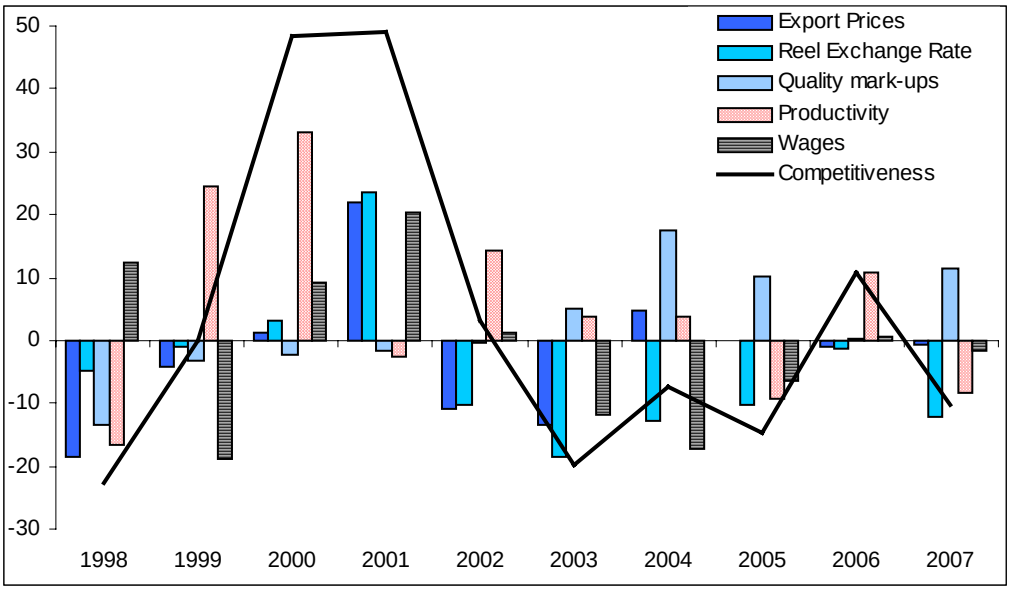
. Leather manufacturing is a large traditional industry in Turkey and a major exporter.
. It achieved a good competitive record between 1998-2007 and is a successful case of competitive renewal through restructuring.
. The driving force was successful product innovation and differentiation. Productivity gains were less regular, as the industry went through far-reaching restructurings. Productivity growth should be stronger in the future.

A) Competitiveness (1997=100)



B) Sources of EPMI

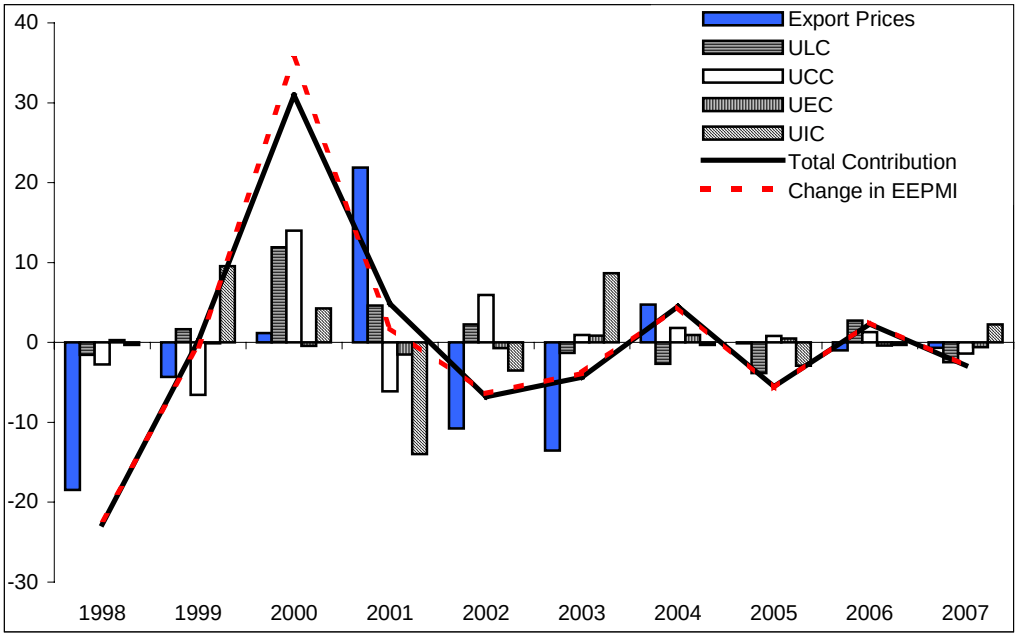
Percentage change in unit labour cost based competitiveness and estimated contributions of prices, real exchange rate, quality mark-ups, productivity and wages



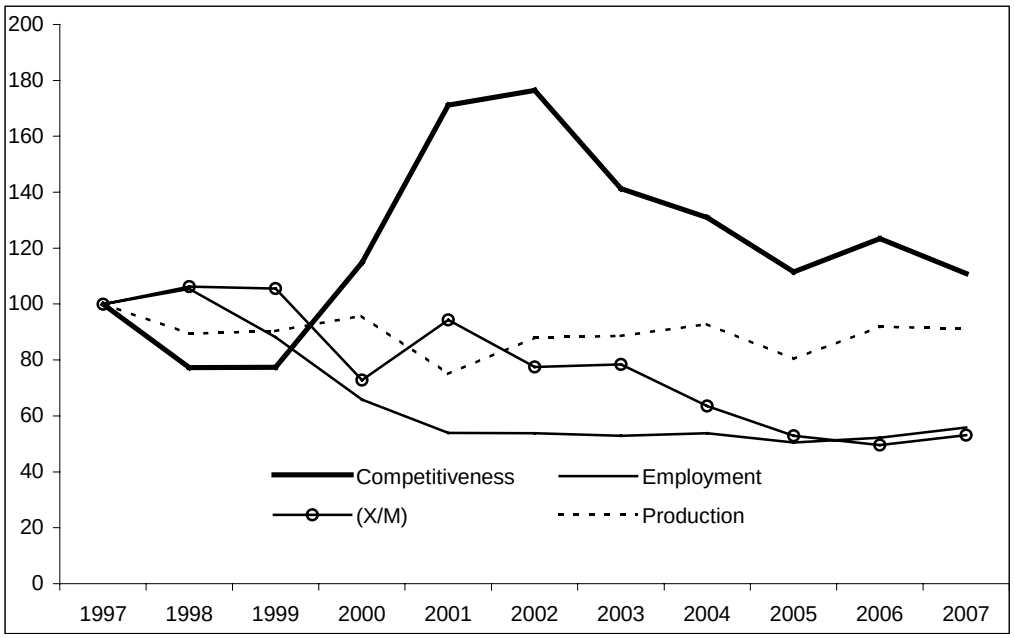
. Capital intensity increased and the industry benefitted from declines in capital costs. It also resorts to an increased proportion of imported inputs and benefitted from the decline of their costs.

C) Sources of extended EPMI

Percentage change in total unit costs based competitiveness and estimated contributions of prices, unit labour costs, unit capital costs, unit energy costs, unit imported costs



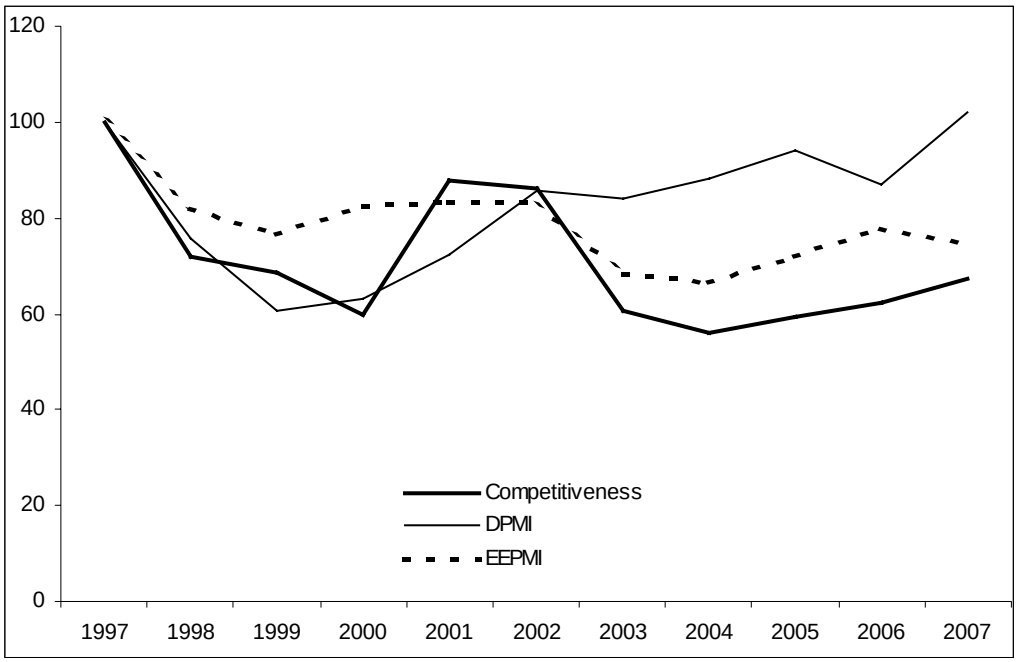
D) Trade balance and employment (1997=100)



4.5 Wood products

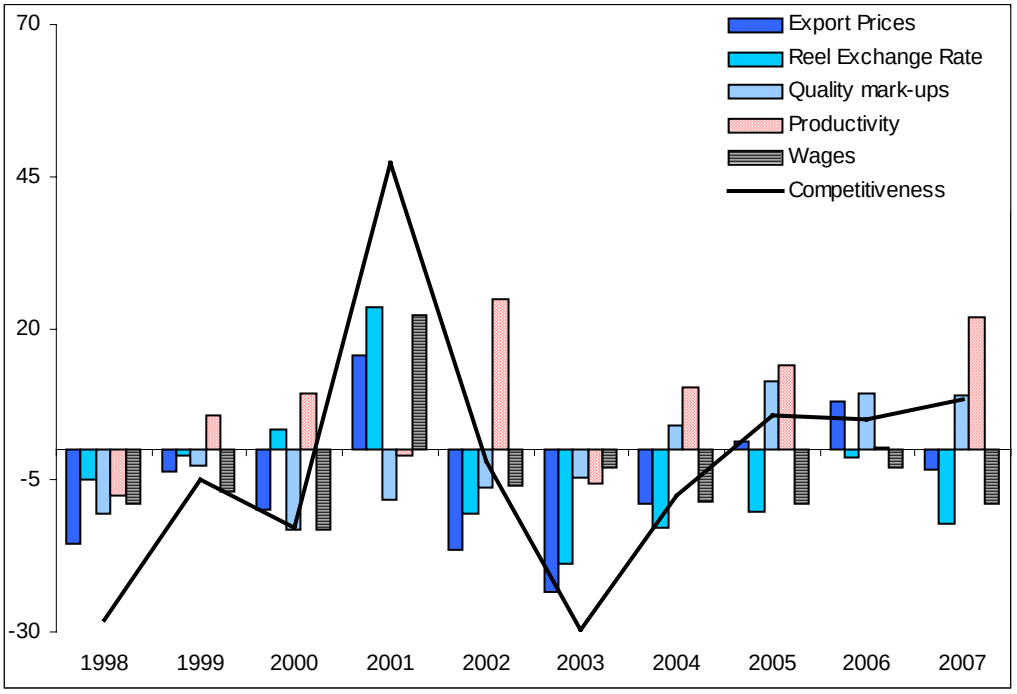
. Strong progress was achieved in the competitiveness of wood products in the 2000s.
. This was driven by gains in productivity and product quality.

A) Competitiveness (1997=100)



B) Sources of EPMI

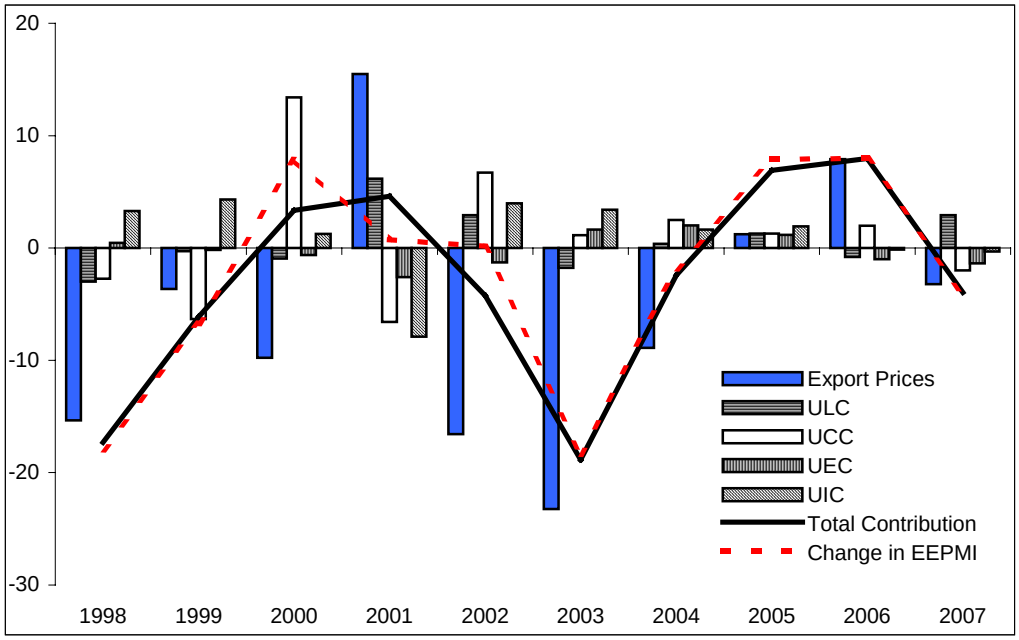
Percentage change in unit labour cost based competitiveness and estimated contributions of prices, real exchange rate, quality mark-ups, productivity and wages



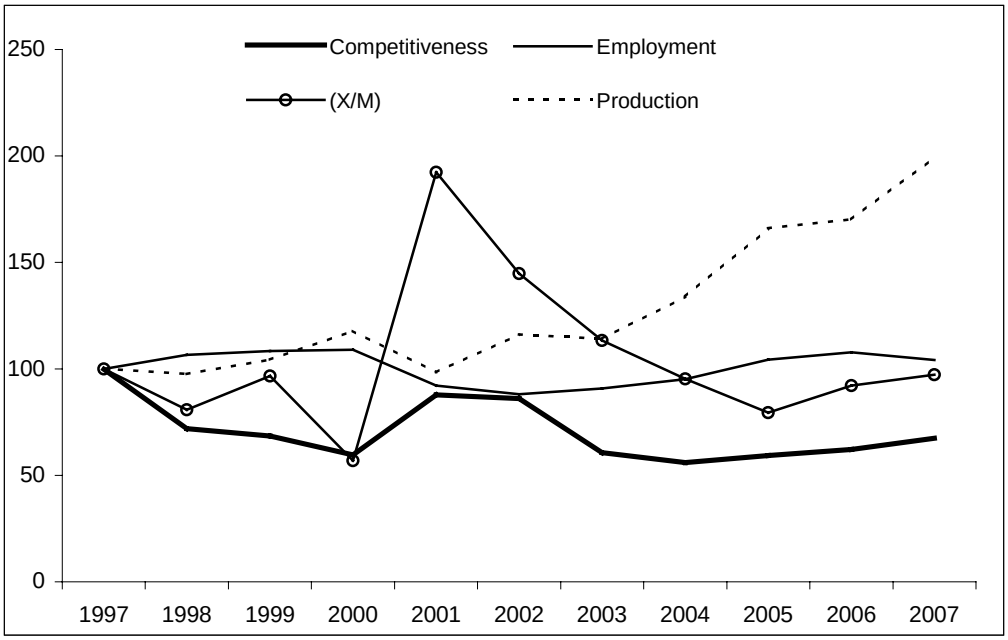
. *Wage growth was also rapid but remained affordable because of strong productivity growth.*
. *The sector became more capital intensive and benefited from declines in capital costs.*

C) Sources of extended EPMI

Percentage change in total unit costs based competitiveness and estimated contributions of prices, unit labour costs, unit capital costs, unit energy costs, unit imported costs



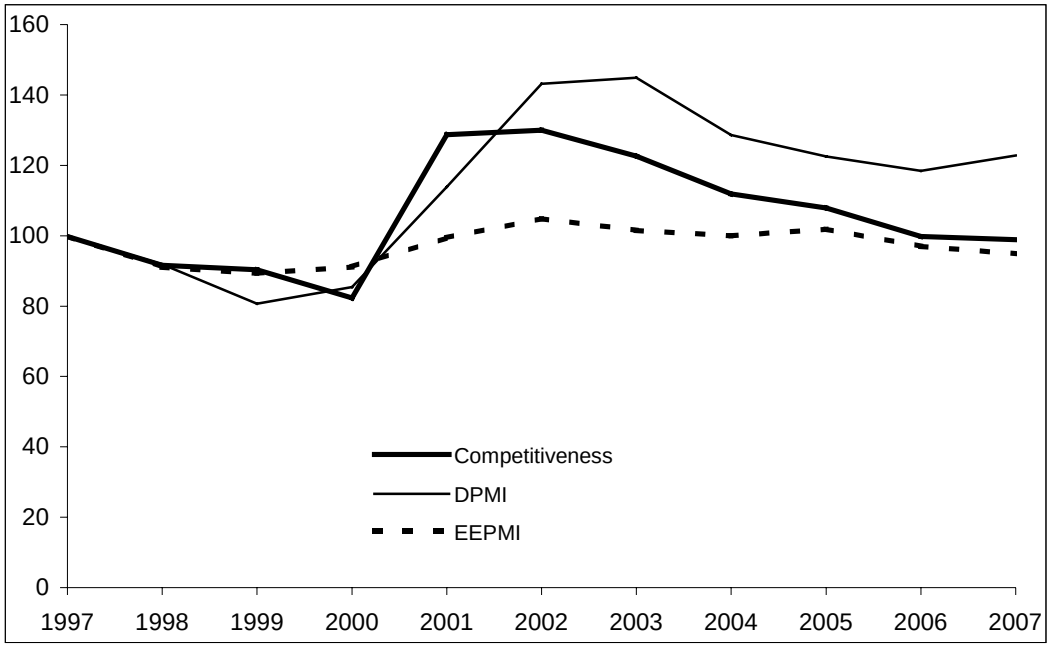
D) Trade balance and employment (1997=100)



4.6 Paper and paper products

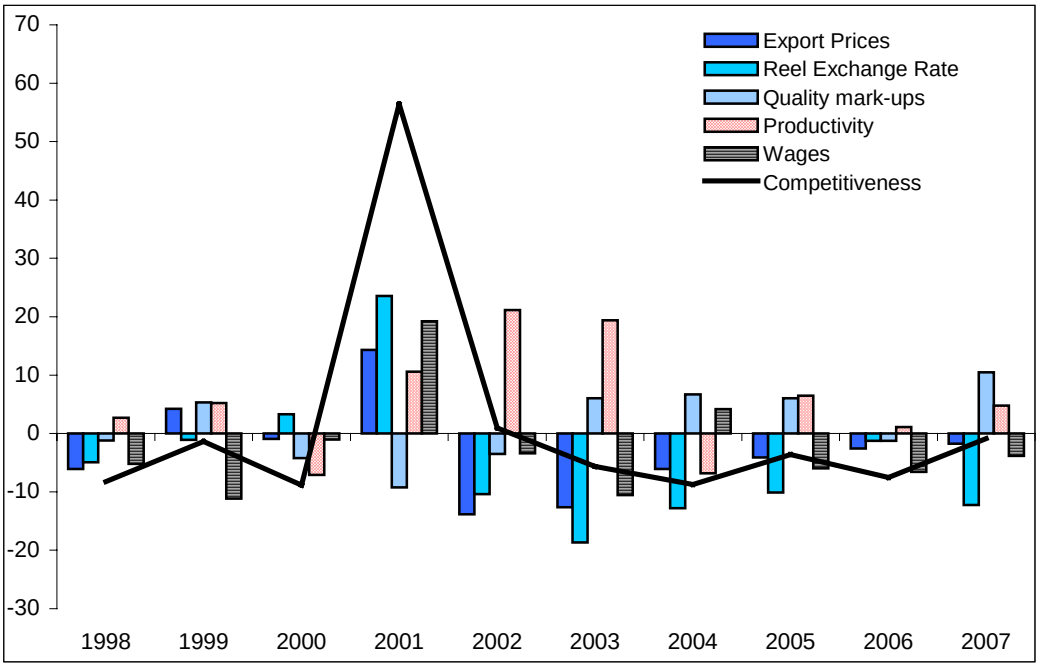
. A competitive renewal appears to have started in early 2000s but momentum was somewhat lost in subsequent years, until a recent upturn in 2007.

A) Competitiveness (1997=100)



B) Sources of EPMI

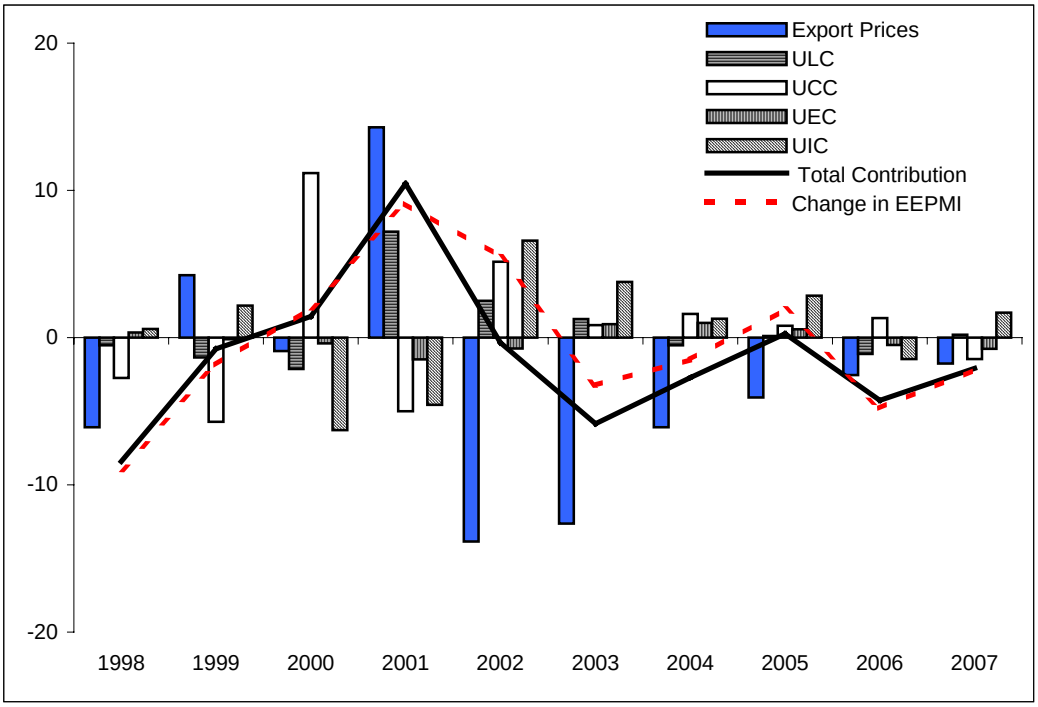
Percentage change in unit labour cost based competitiveness and estimated contributions of prices, real exchange rate, quality mark-ups, productivity and wages



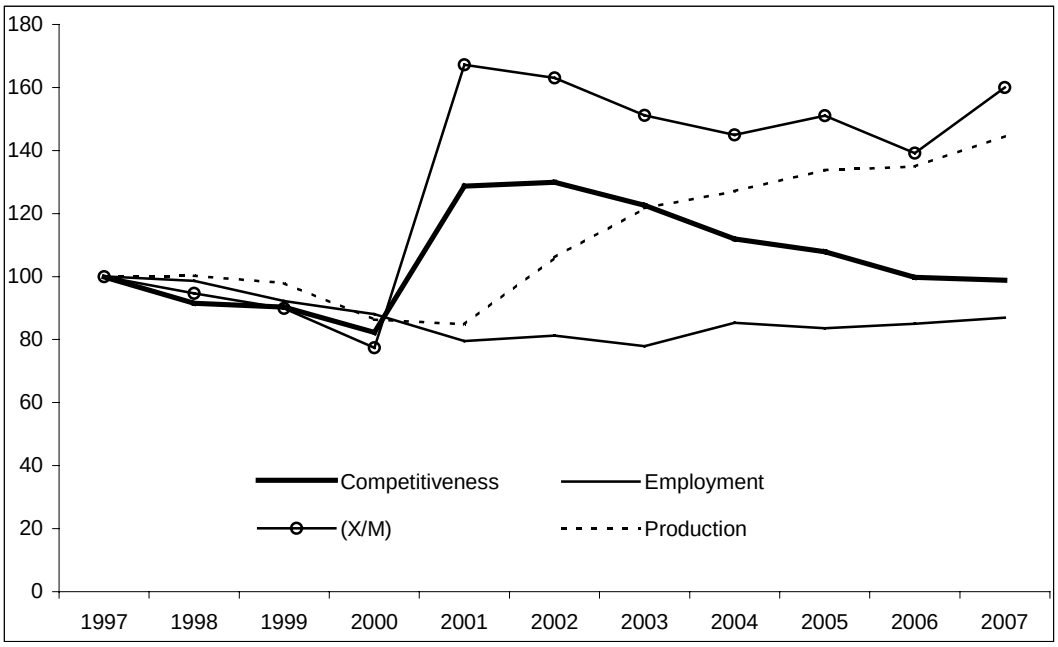
. Productivity gains were a main driving force in the 2000s, together with important quality gains in the more recent period.
. As a capital-intensive industry and as a large importer of inputs it benefited particularly from the recent favourable macroeconomic developments.

C) Sources of extended EPMI

Percentage change in total unit costs based competitiveness and estimated contributions of prices, unit labour costs, unit capital costs, unit energy costs, unit imported costs



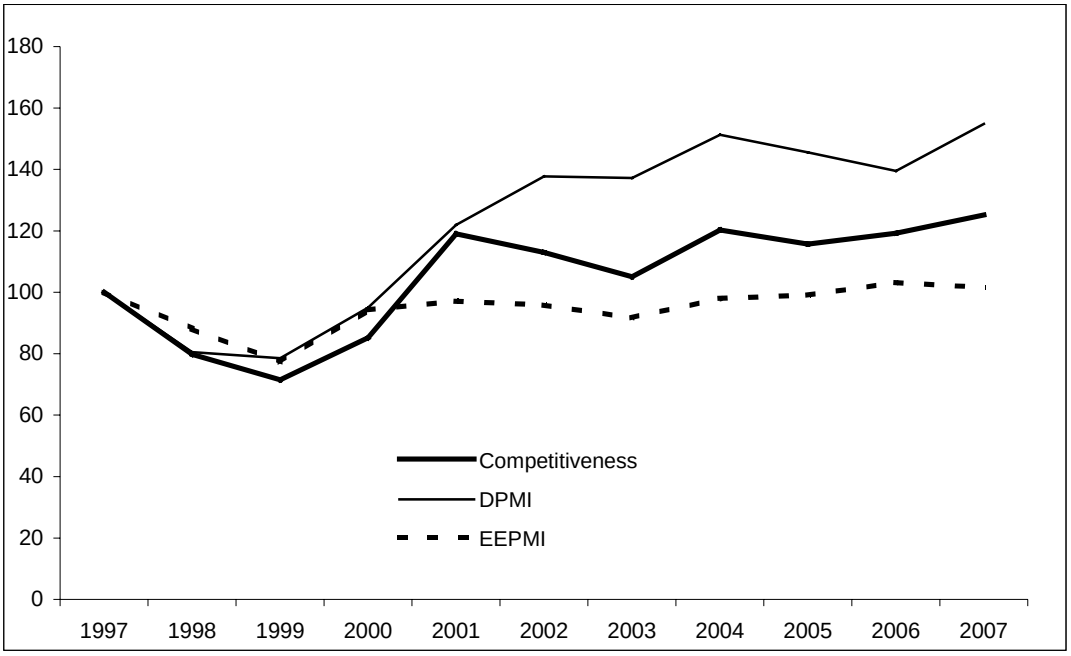
D) Trade balance and employment (1997=100)



4.7 Chemicals

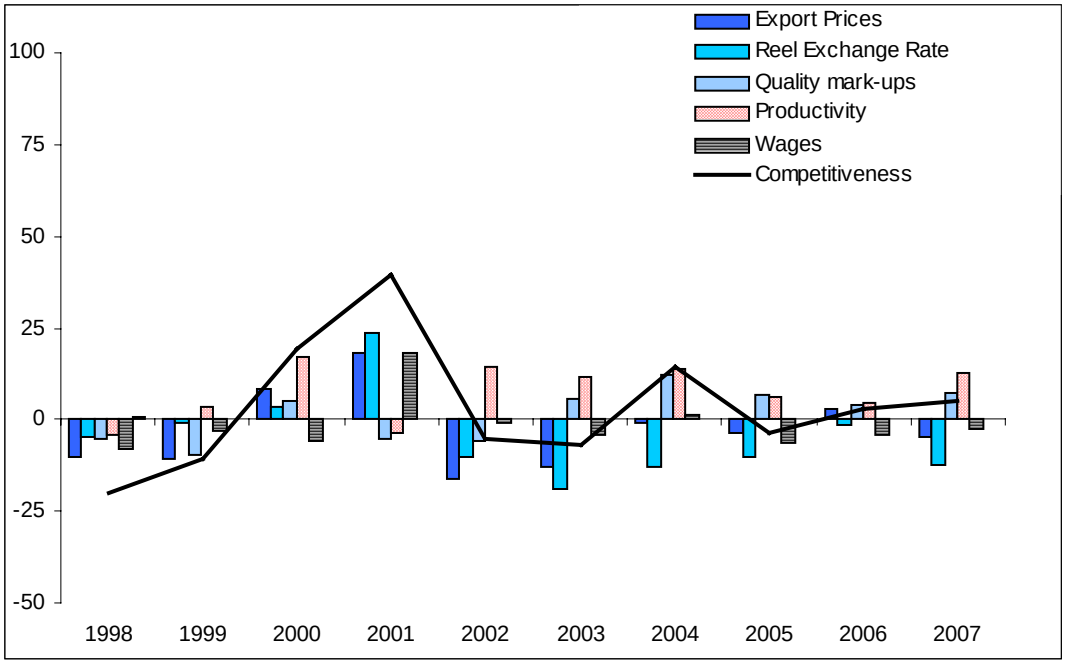
. Chemicals is one of the manufacturing industries which have performed outstandingly well over the past decade.
. Productivity gains were particularly strong.

A) Competitiveness (1997=100)



B) Sources of EPMI

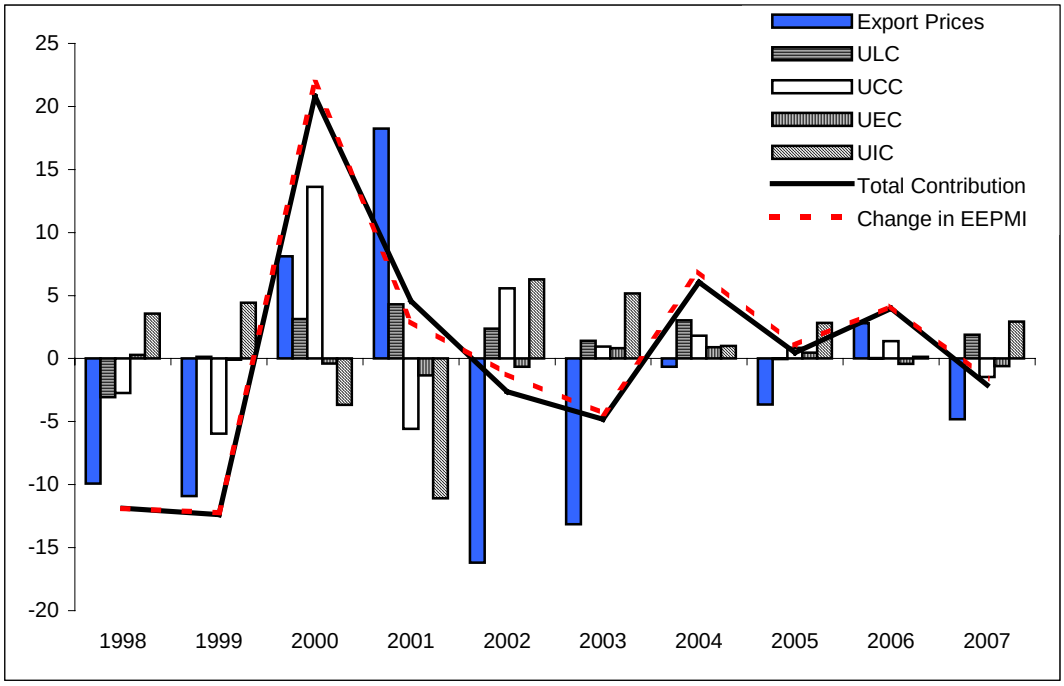
Percentage change in unit labour cost based competitiveness and estimated contributions of prices, real exchange rate, quality mark-ups, productivity and wages



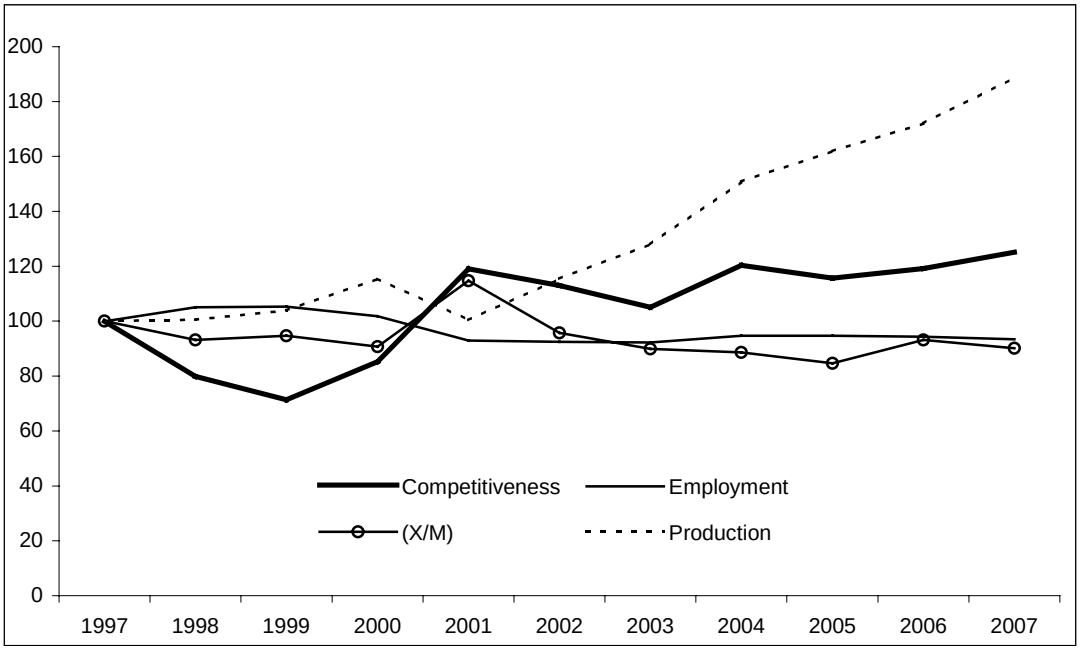
. As a highly capital- and imported input-intensive sector it also benefited importantly from 2000s' macroeconomic developments.
. As a result of accelerated capital deepening net employment declined between 1998 and 2007 despite strong growth.

C) Sources of extended EPMI

Percentage change in total unit costs based competitiveness and estimated contributions of prices, unit labour costs, unit capital costs, unit energy costs, unit imported costs



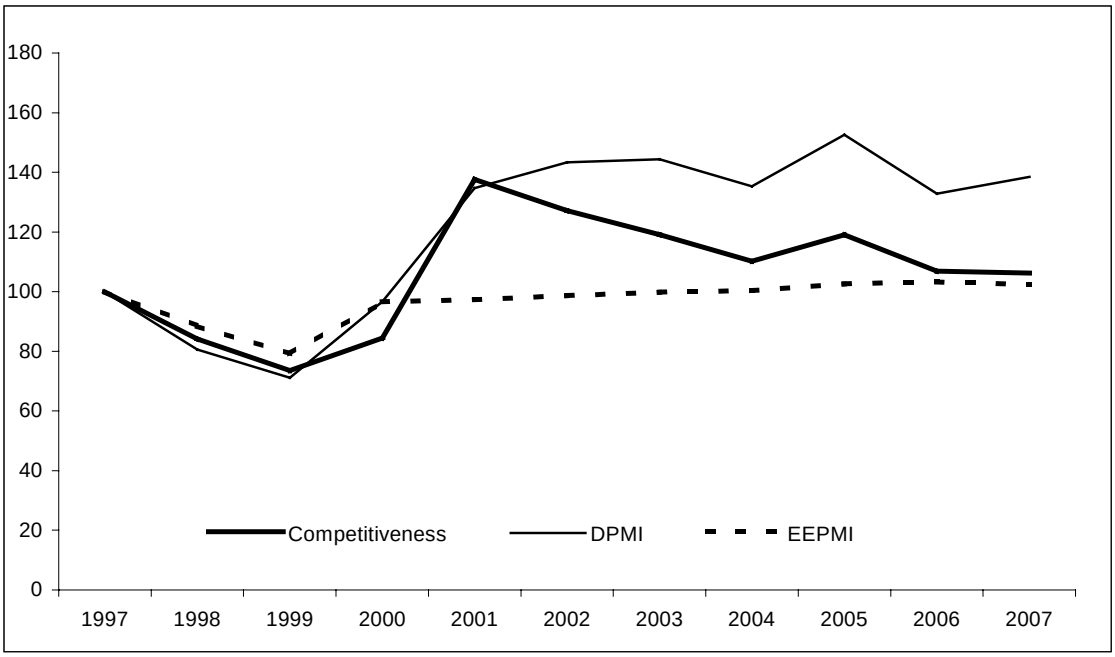
D) Trade balance and employment (1997=100)



4.8 Rubber and plastic products

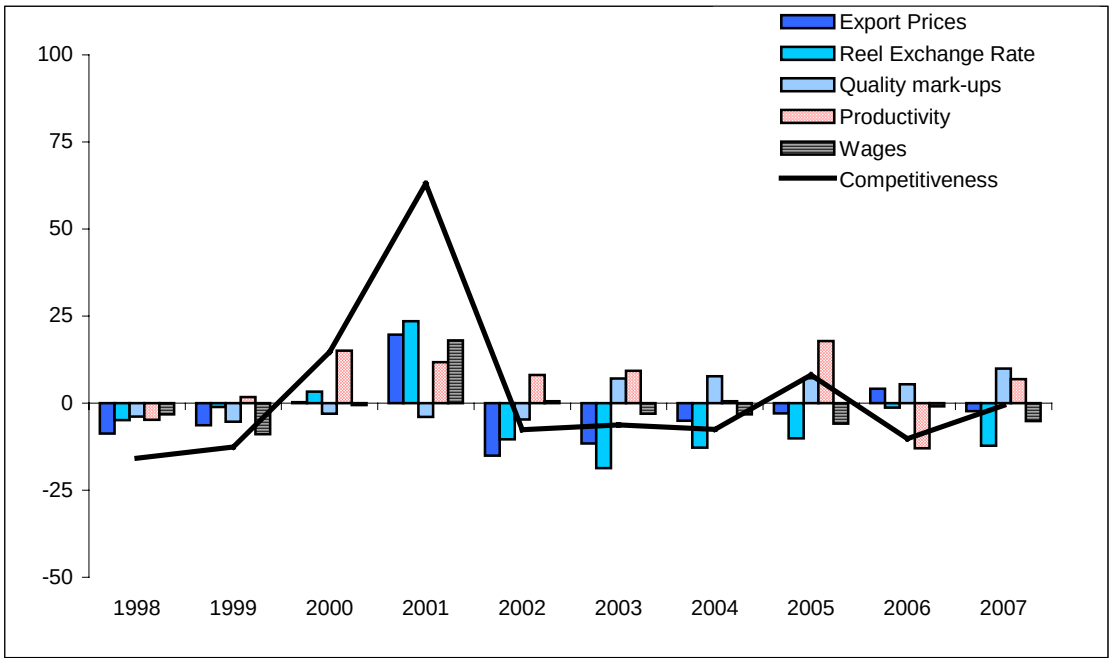
. This sector has improved its performance over the past decade firstly through important productivity gains then with quality improvements.
. Wage growth was slower than in the rest of the industry and helped with competitiveness.
. Productivity and quality gains remain on a strong path.

A) Competitiveness (1997=100)



B) Sources of EPMI

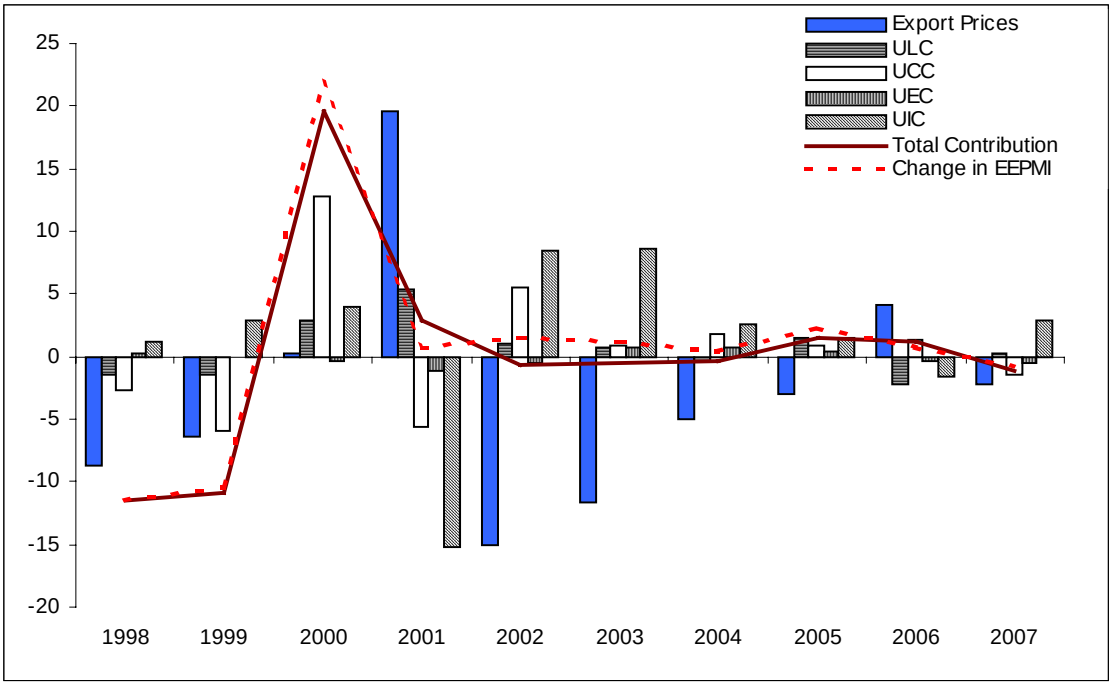
Percentage change in unit labour cost based competitiveness and estimated contributions of prices, real exchange rate, quality mark-ups, productivity and wages



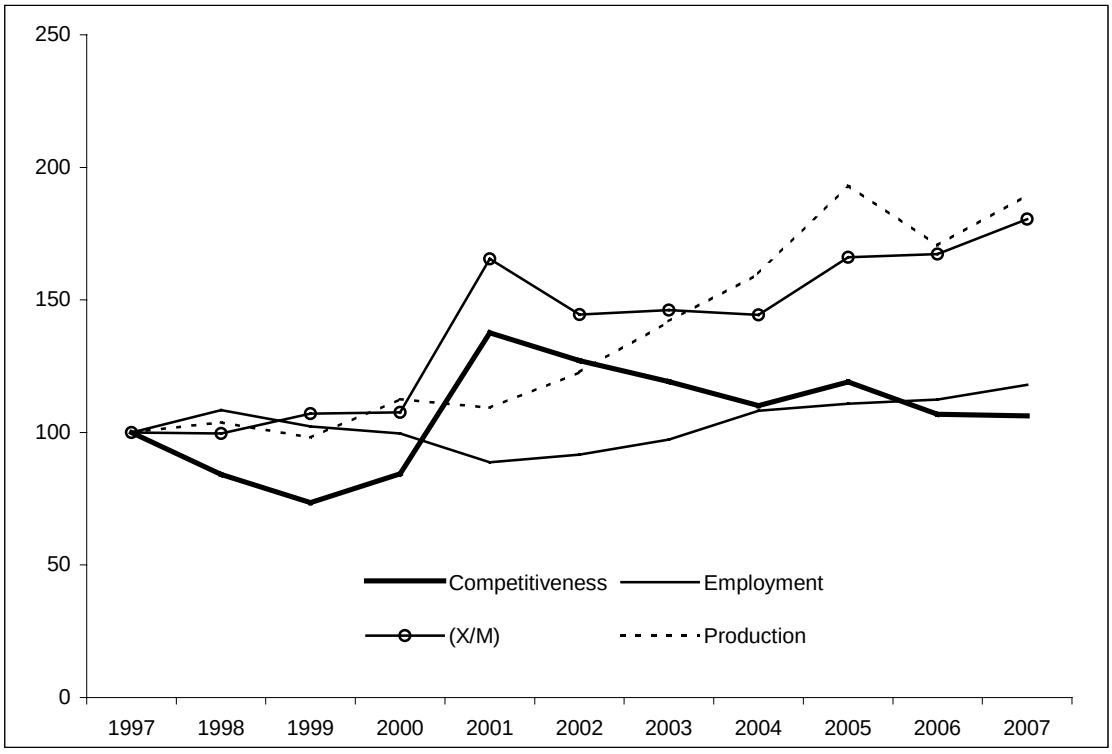
. *Declines in imported input costs were significant.*
. *Trade performance has steadily improved and net employment increased.*

C) Sources of extended EPMI

Percentage change in total unit costs based competitiveness and estimated contributions of prices, unit labour costs, unit capital costs, unit energy costs, unit imported costs



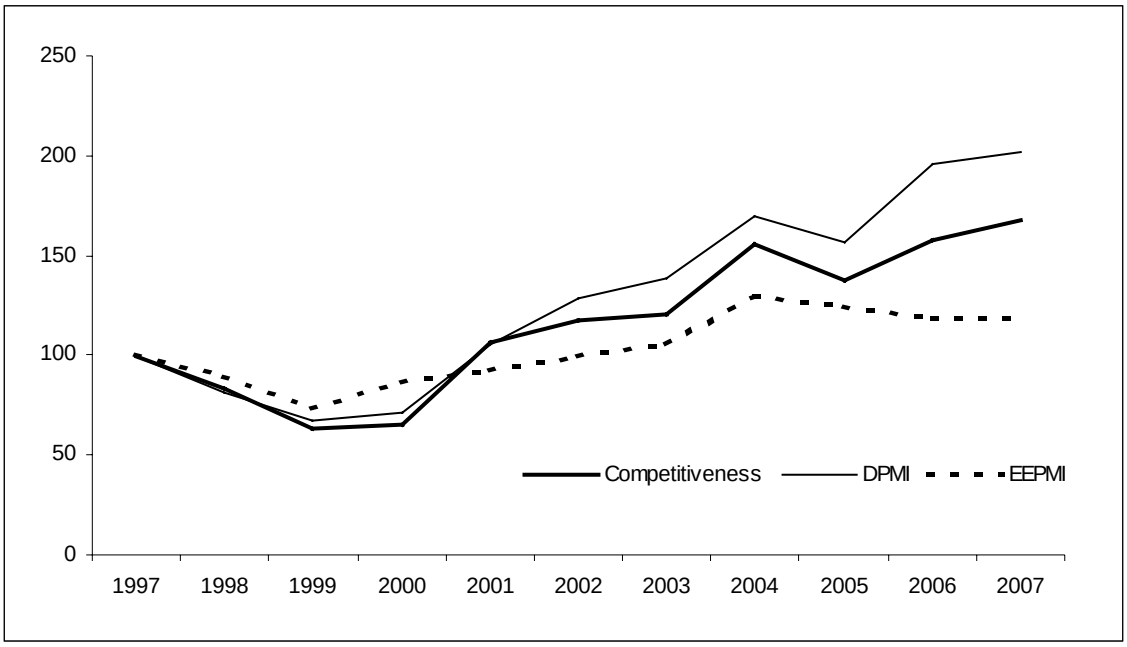
D) Trade balance and employment (1997=100)



4.9 Basic metals

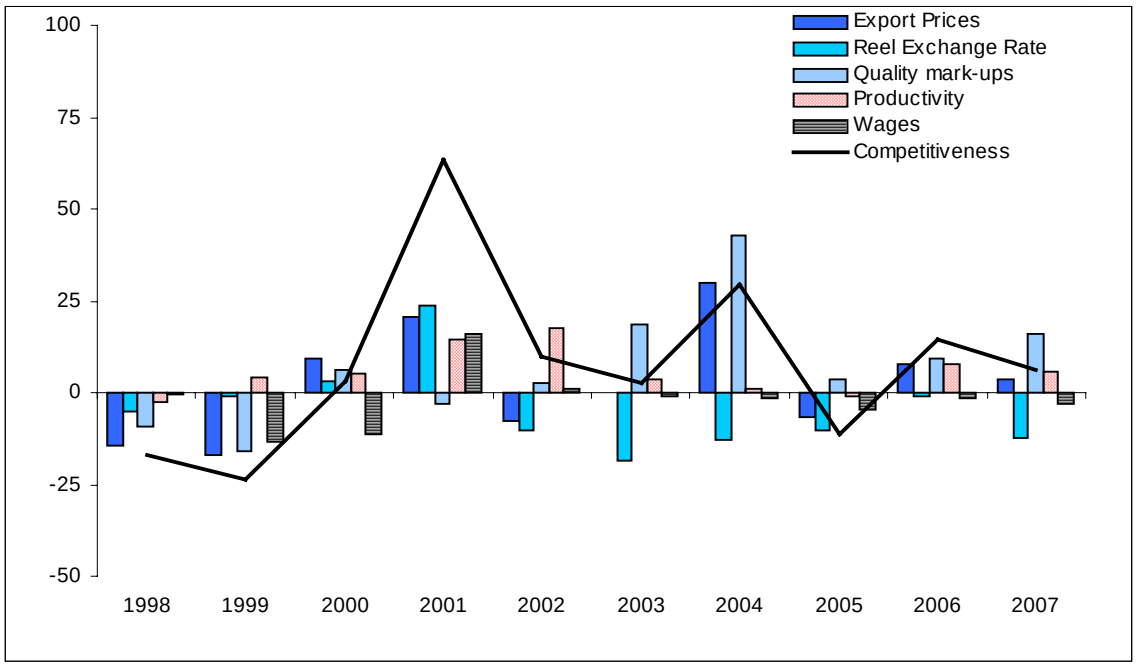
. Centred on steel production, this sector improved its performance between 1998-2007.
. Very robust world demand and high international transportation costs have apparently kept the pressures of international competition relatively weak. Trend currency appreciation had practically no impact on margins.

A) Competitiveness (1997=100)



B) Sources of EPMI

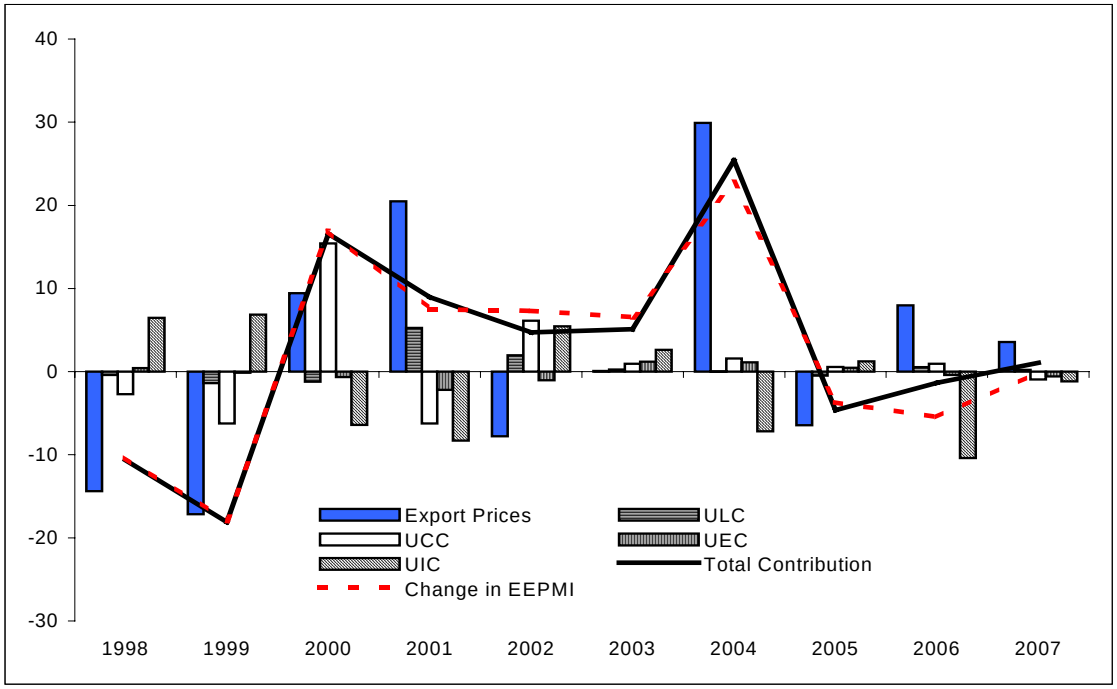
Percentage change in unit labour cost based competitiveness and estimated contributions of prices, real exchange rate, quality mark-ups, productivity and wages



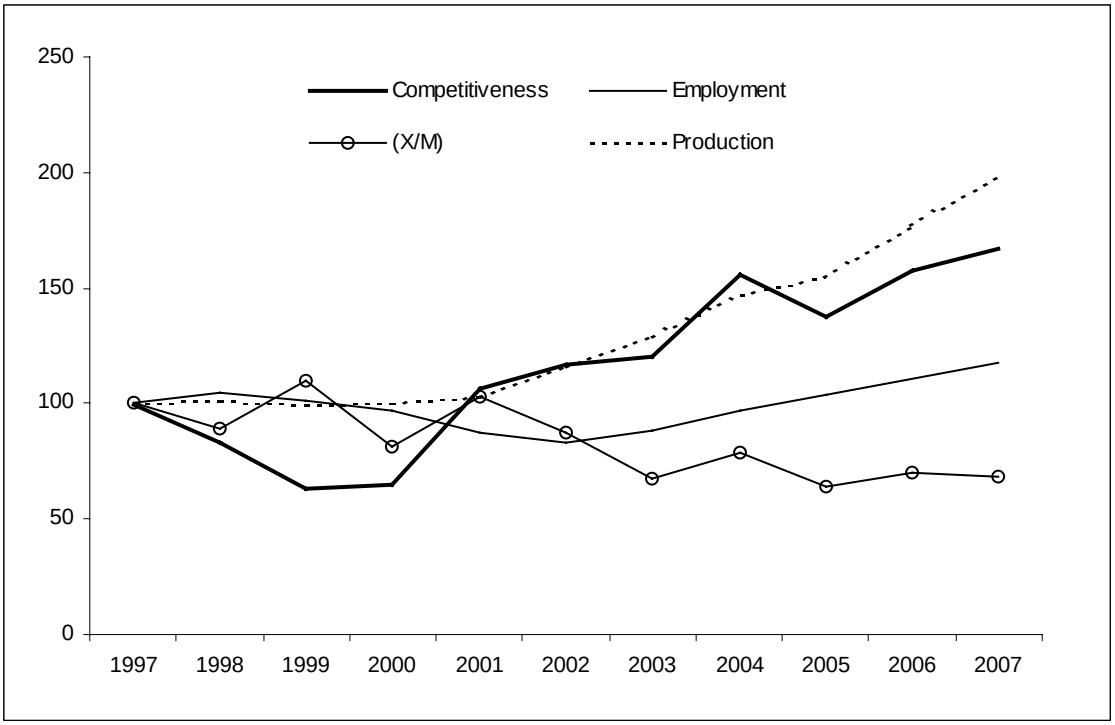
. Productivity growth was very strong and was combined with slow wage increases, boosting competitiveness.
. The trade balance and the employment level have significantly improved.

C) Sources of extended EPMI

Percentage change in total unit costs based competitiveness and estimated contributions of prices, unit labour costs, unit capital costs, unit energy costs, unit imported costs



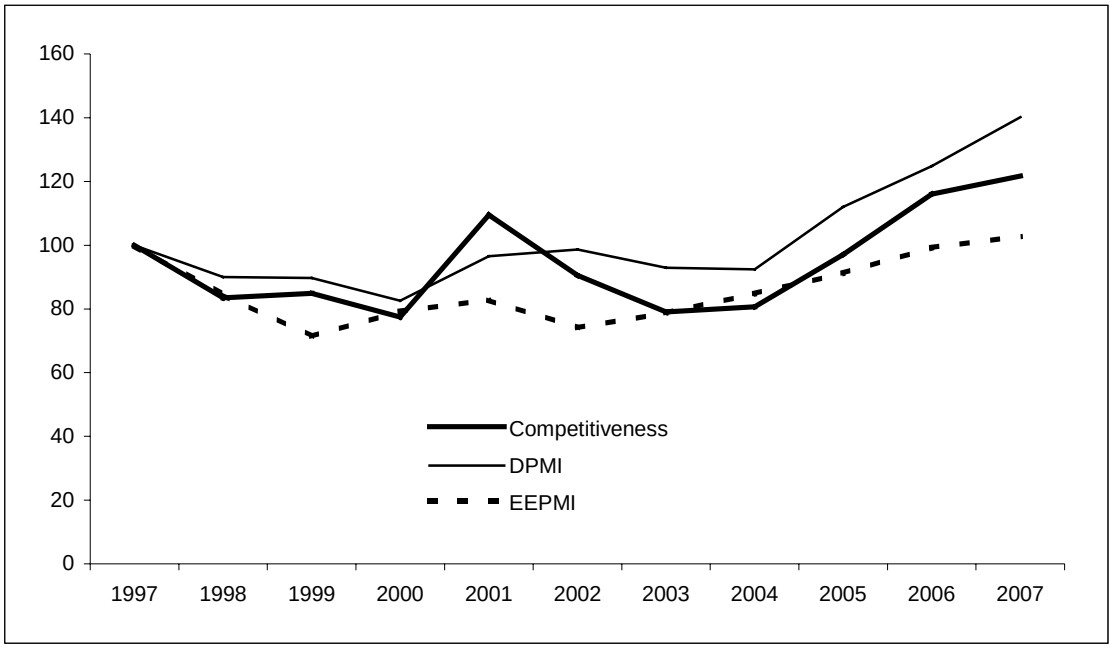
D) Trade balance and employment (1997=100)



4.10 Metal products

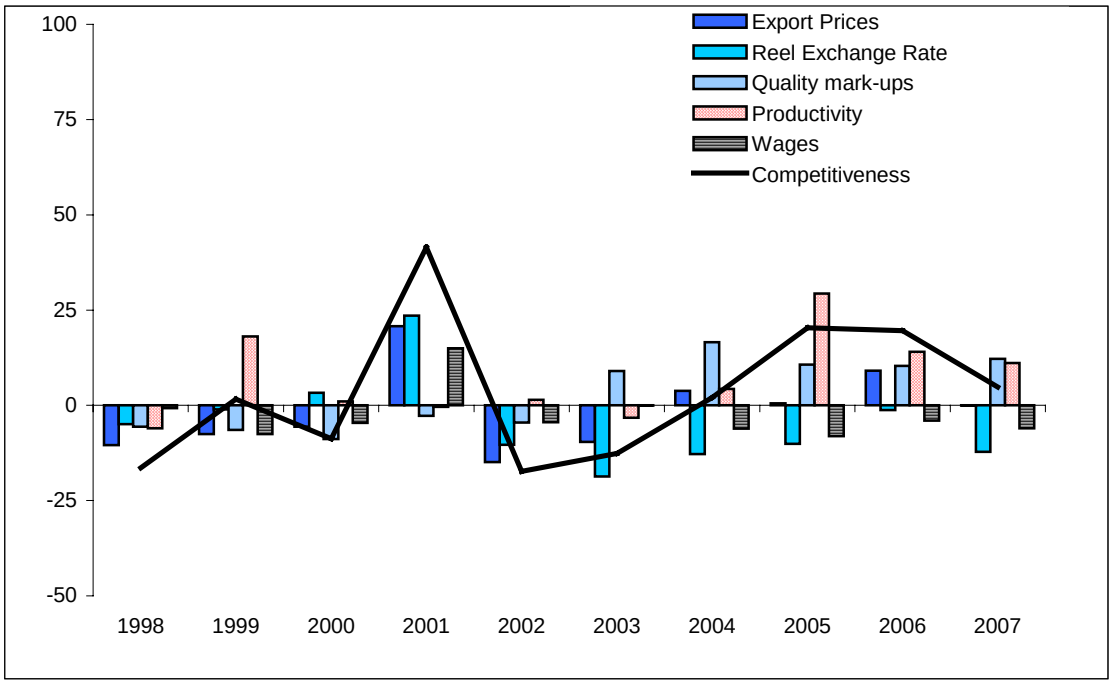
. Backed by strong upstream supplies, the metal products industry has steadily improved its performance between 1998-2007.
. Important productivity and quality gains, in particular in the past four years, underpinned this performance.

A) Competitiveness (1997=100)



B) Sources of EPMI

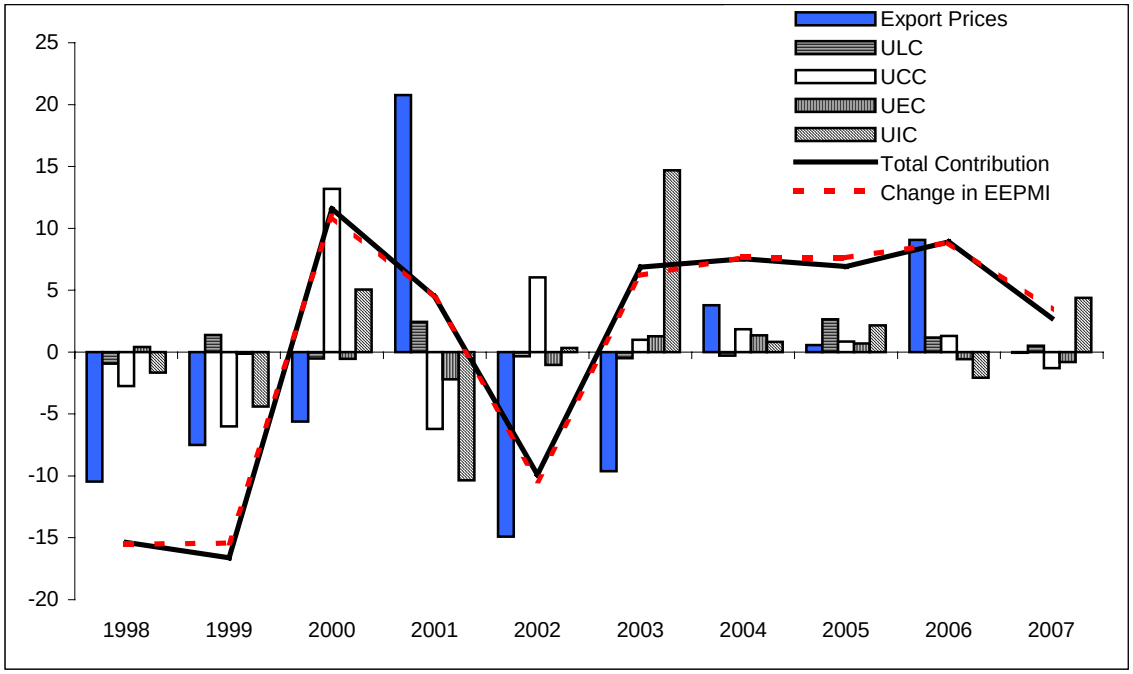
Percentage change in unit labour cost based competitiveness and estimated contributions of prices, real exchange rate, quality mark-ups, productivity and wages



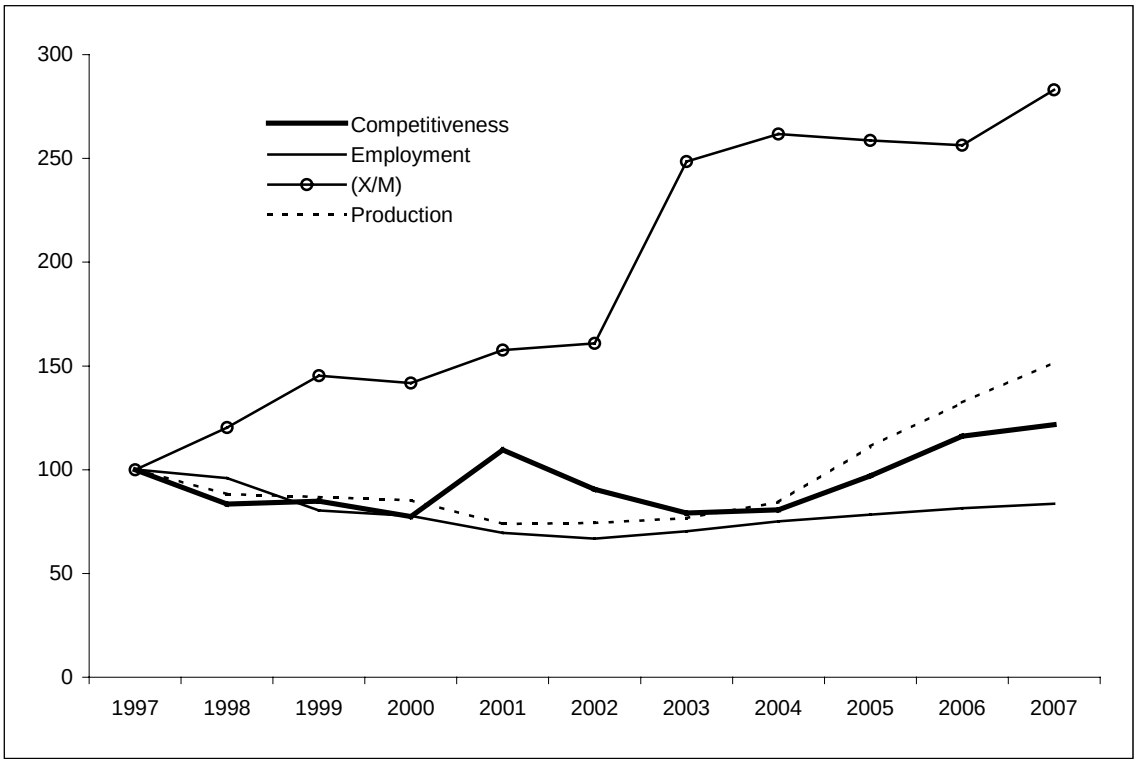
. *Moderate wage growth was another source of strength.*
. *The trade balance has improved while, due to productivity gains, employment growth has been slower.*

C) Sources of extended EPMI

Percentage change in total unit costs based competitiveness and estimated contributions of prices, unit labour costs, unit capital costs, unit energy costs, unit imported costs



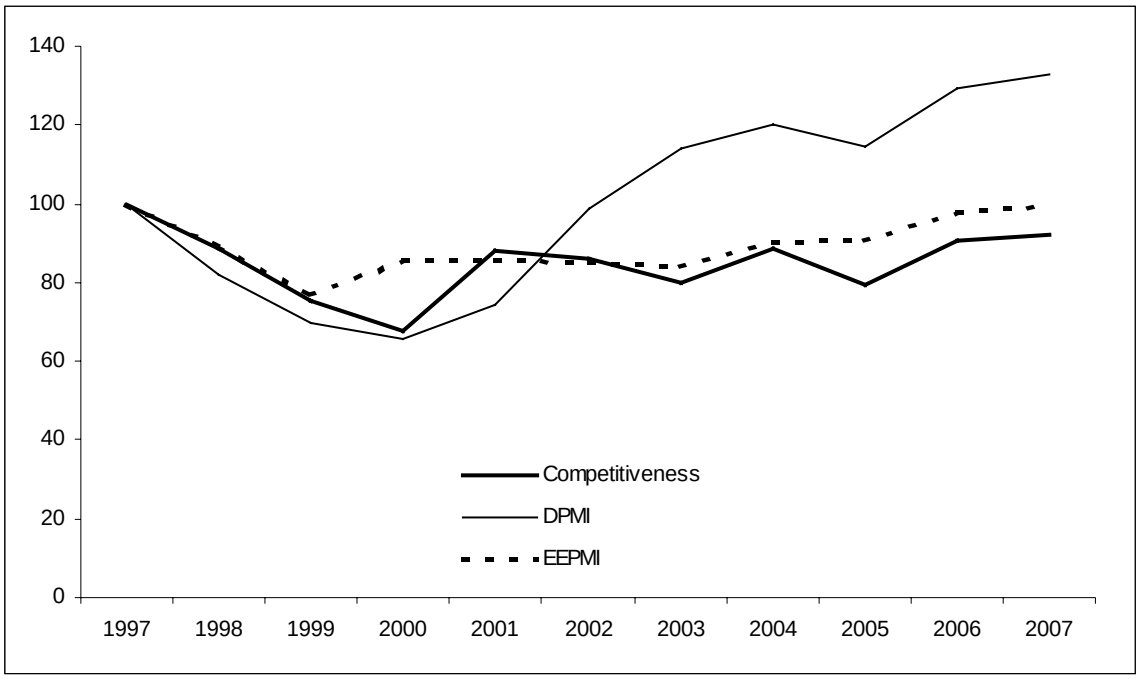
D) Trade balance and employment (1997=100)



4.11 Machinery and equipment

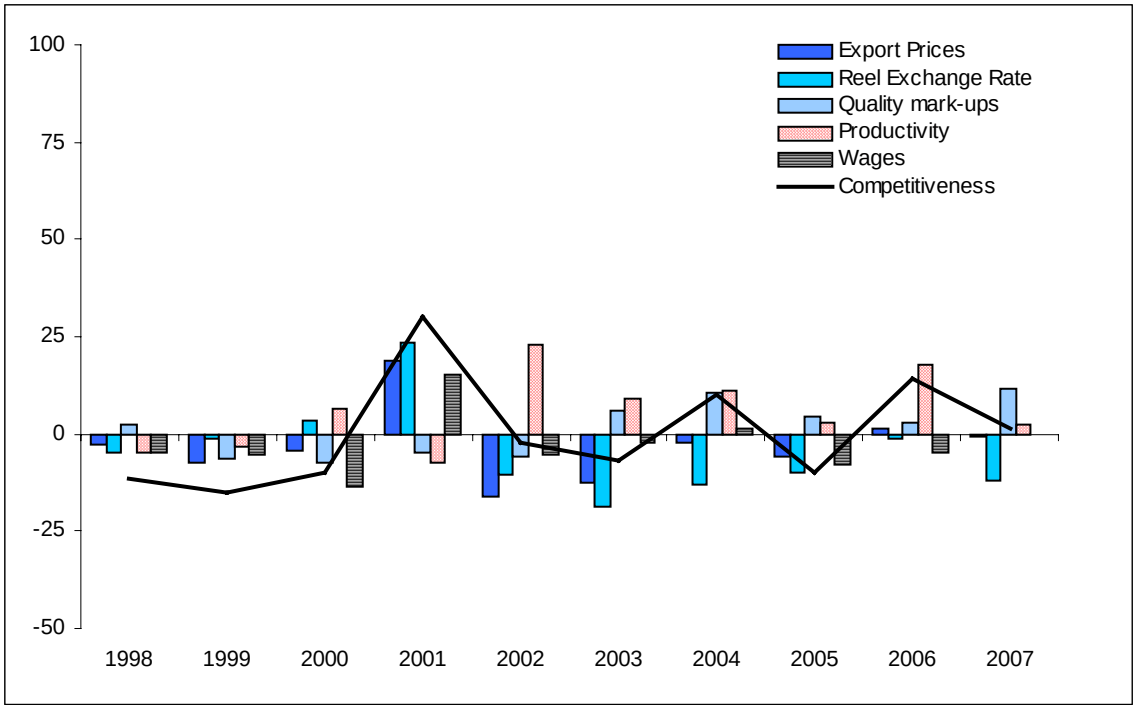
. The performance of machinery and equipment production, as a rapidly growing medium-to-high technology sector, epitomises the structural renewal of the Turkish industry.
. Steady progress in productivity and quality gains underpined this performance.

A) Competitiveness (1997=100)



B) Sources of EPMI

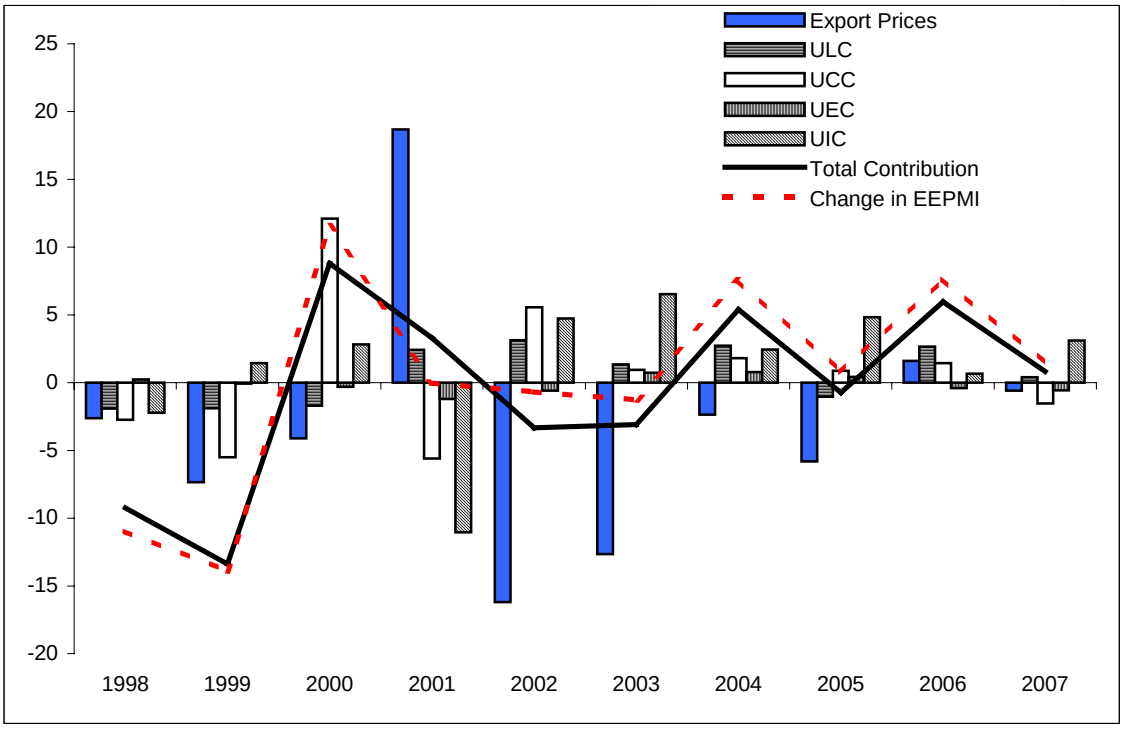
Percentage change in unit labour cost based competitiveness and estimated contributions of prices, real exchange rate, quality mark-ups, productivity and wages



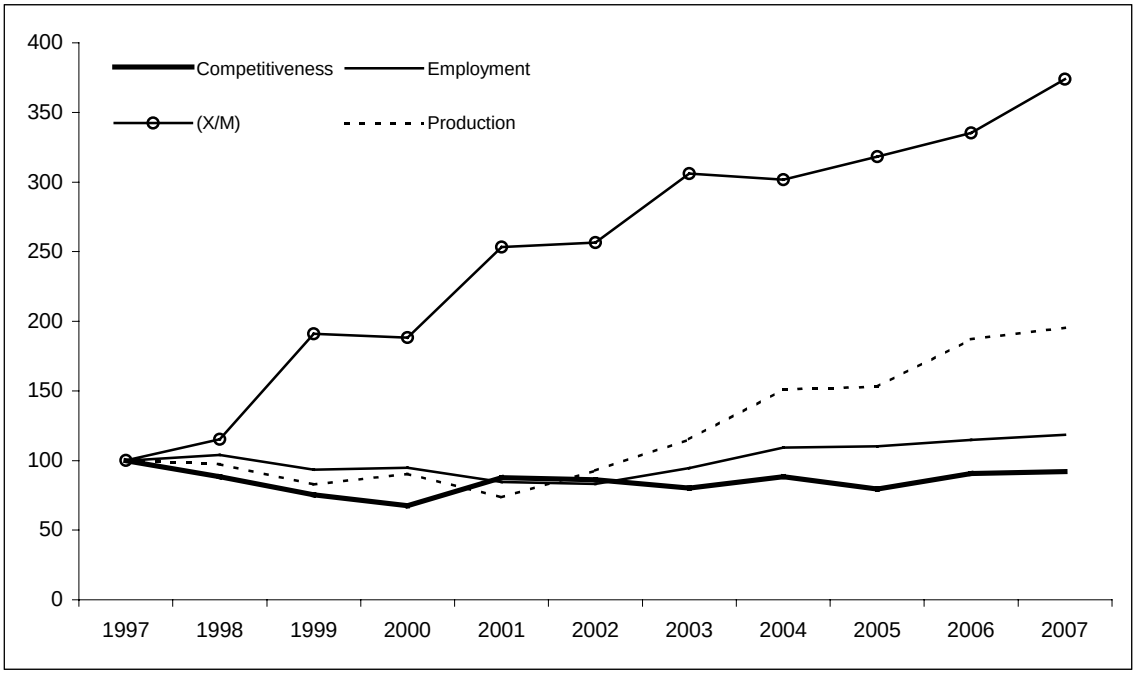
. As a strong capital investor and user of international inputs, it benefited strongly from 2000s' favourable macroeconomic developments.
. The trade balance is improving but because of strong productivity gains employment growth is slower.

C) Sources of extended EPMI

Percentage change in total unit costs based competitiveness and estimated contributions of prices, unit labour costs, unit capital costs, unit energy costs, unit imported costs



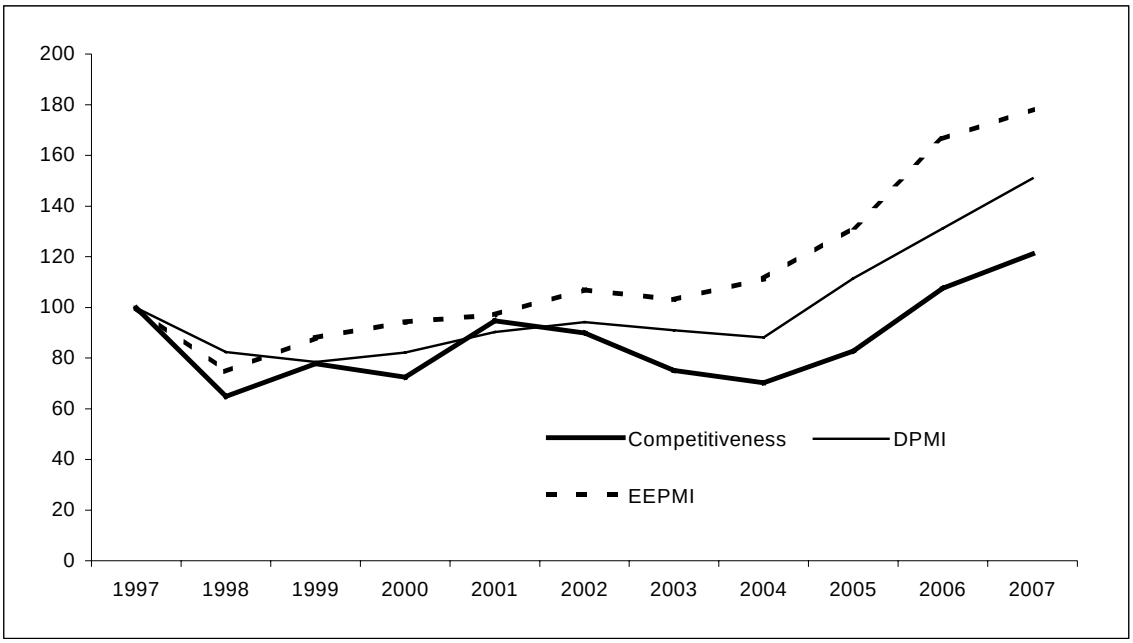
D) Trade balance and employment (1997=100)



4.12 Electrical machinery

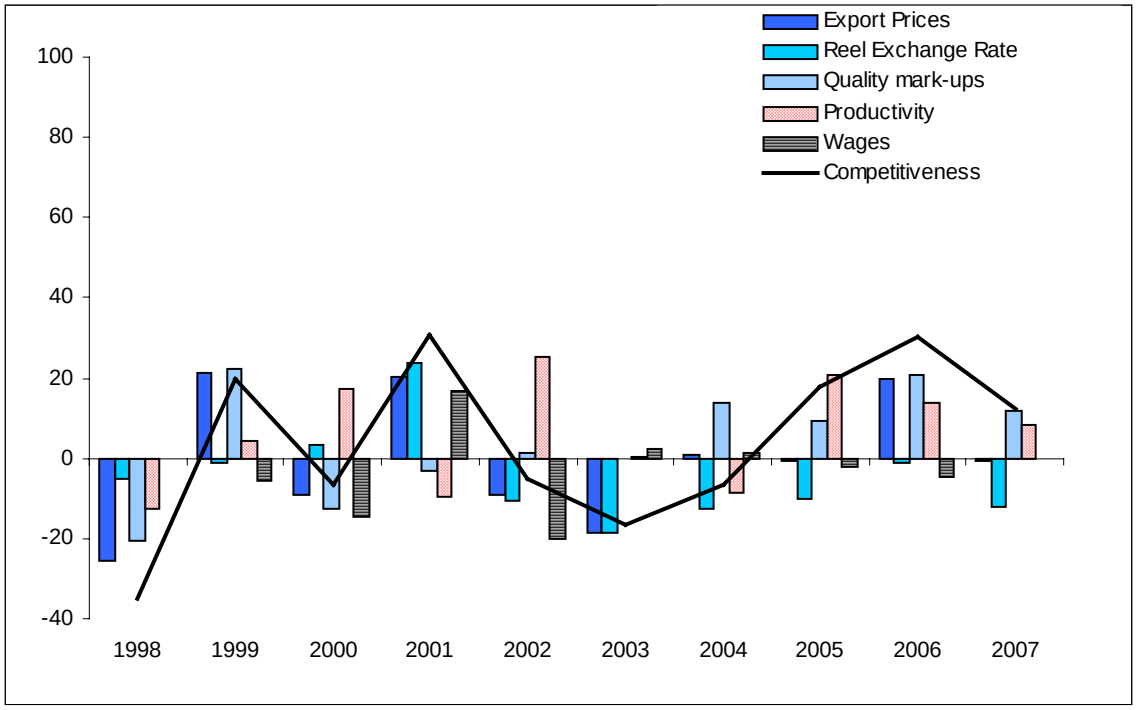
. Electrical machinery is another medium technology sector which has done particularly well over the past decade. Turkey has become a major supplier of white goods (notably kitchen and washing equipment) to the European market.

A) Competitiveness (1997=100)



B) Sources of EPMI

Percentage change in unit labour cost based competitiveness and estimated contributions of prices, real exchange rate, quality mark-ups, productivity and wages

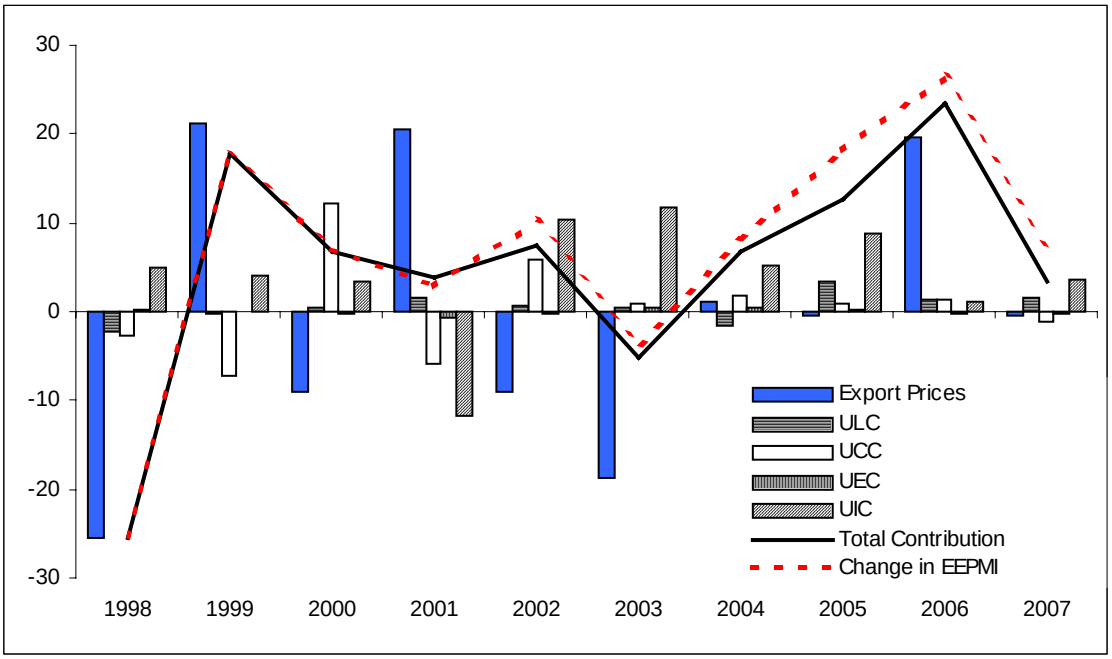


. Strong productivity and quality gains neutralised significant competitive pressures from lower-cost countries.

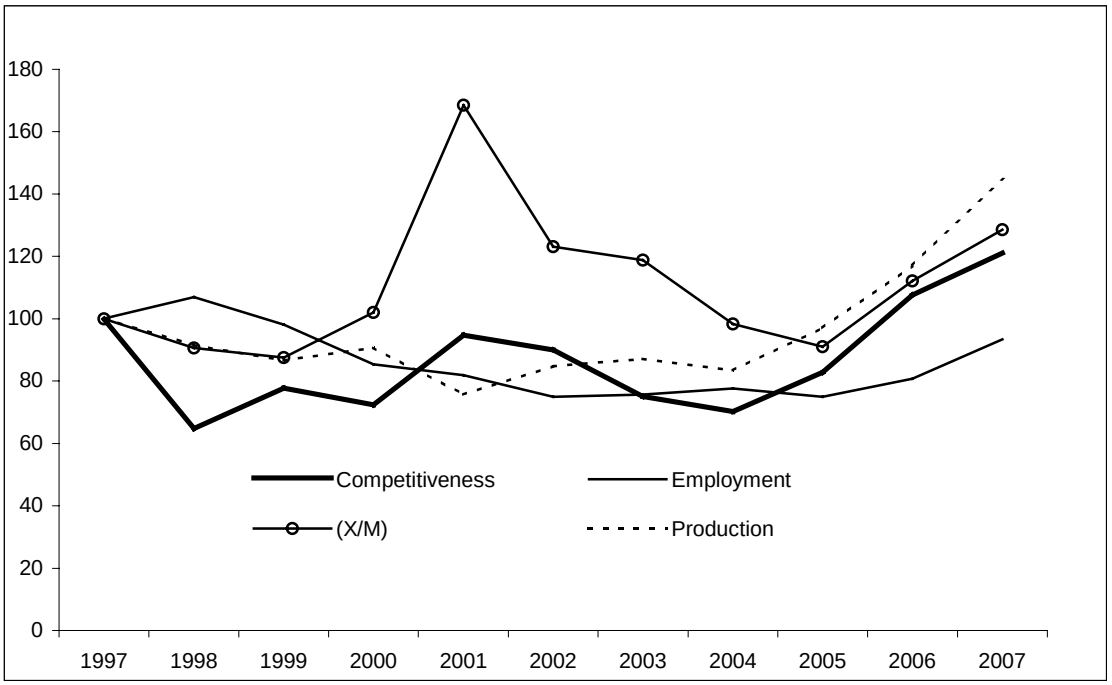
. The trade balance improved despite very robust domestic demand in consumer durables. Employment remained flat as a result of productivity gains but showed signs of revival in the most recent period.

C) Sources of extended EPMI

Percentage change in total unit costs based competitiveness and estimated contributions of prices, unit labour costs, unit capital costs, unit energy costs, unit imported costs



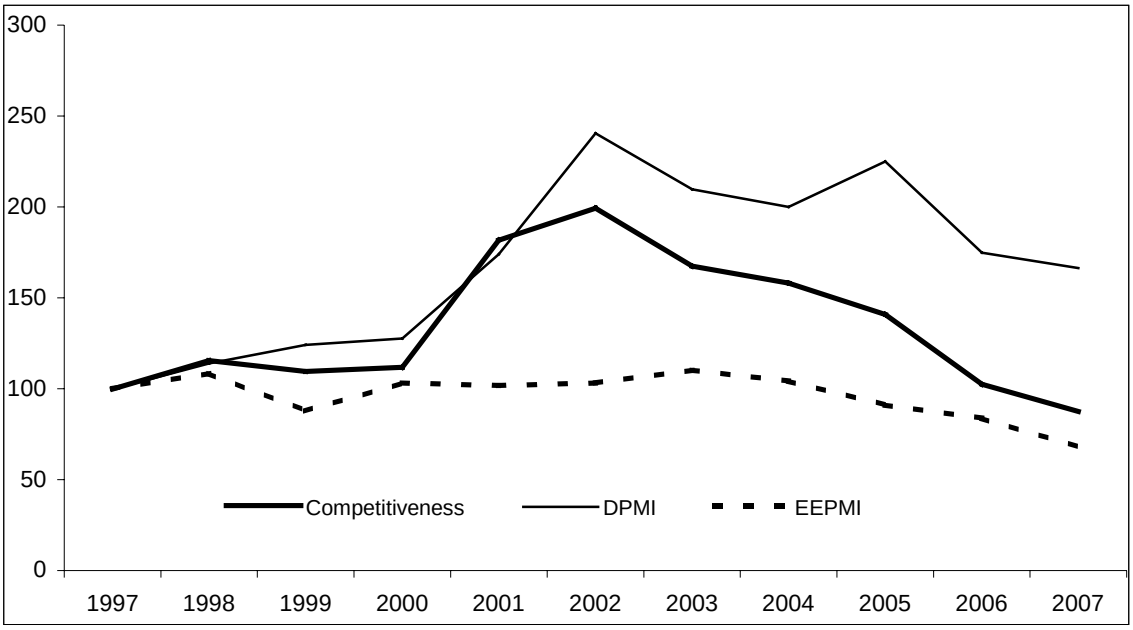
D) Trade balance and employment (1997=100)



4.13 Radio and TV equipment

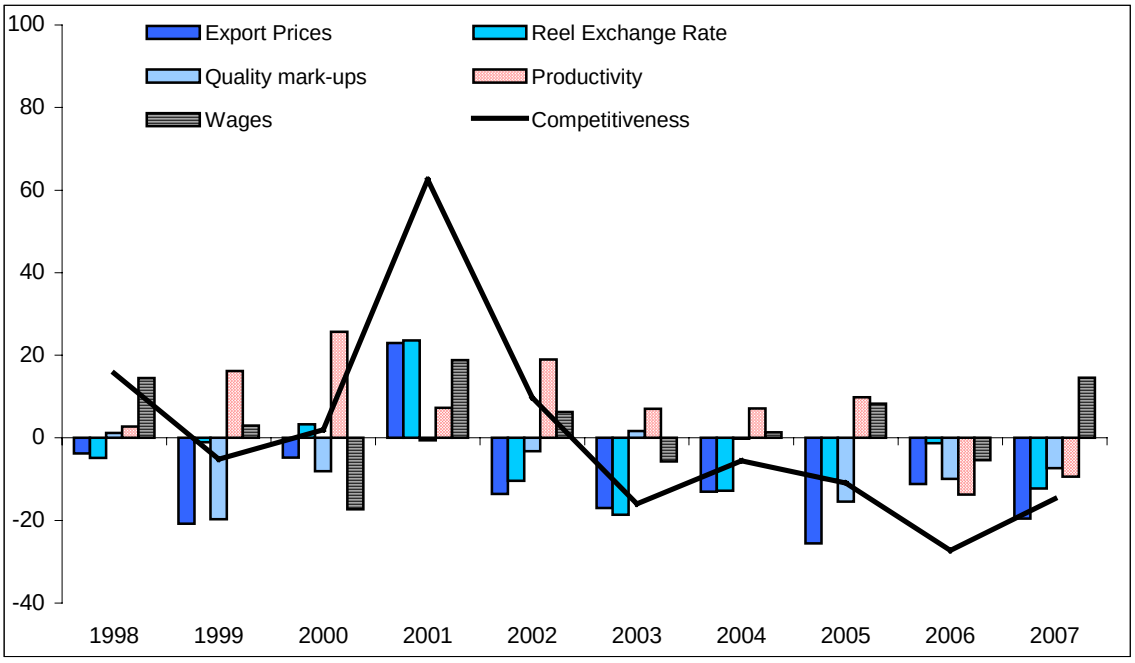
. Radio and TV manufacturing was set to become another Turkish success story in medium-to-high technology, but faced new challenges.
. After a successful start and steady increases in profit margins and market shares in early 2000s, a squeeze occurred. It was due principally to very tough price and quality competition from other manufacturers.

A) Competitiveness (1997=100)



B) Sources of EPMI

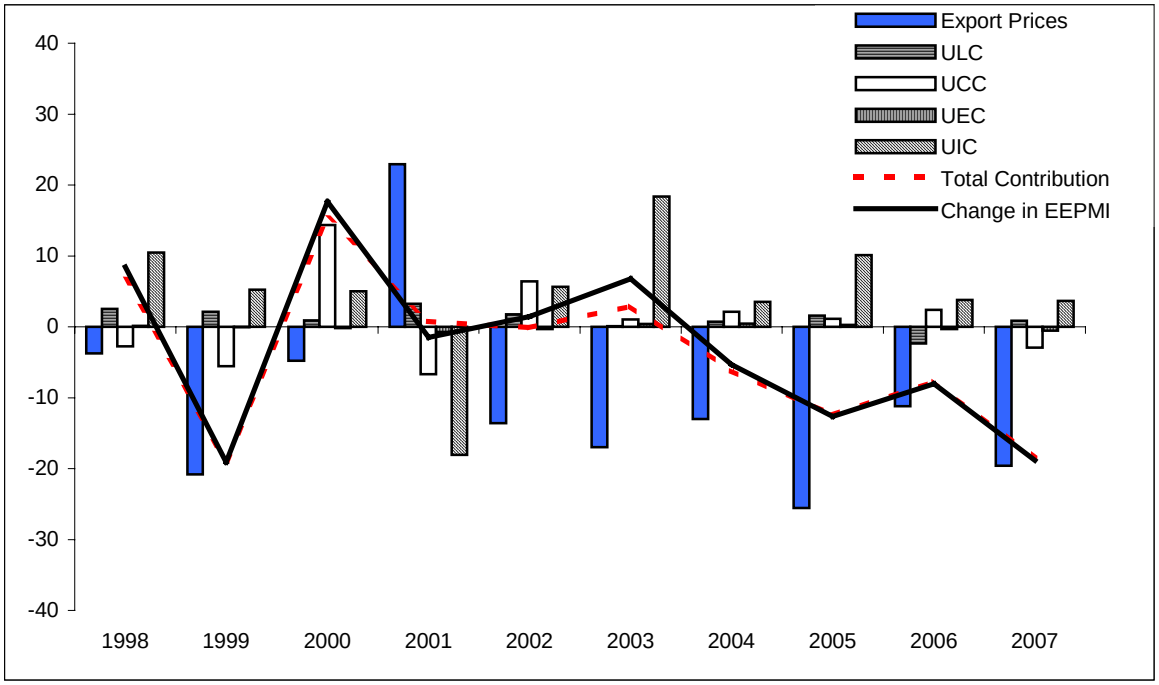
Percentage change in unit labour cost based competitiveness and estimated contributions of prices, real exchange rate, quality mark-ups, productivity and wages



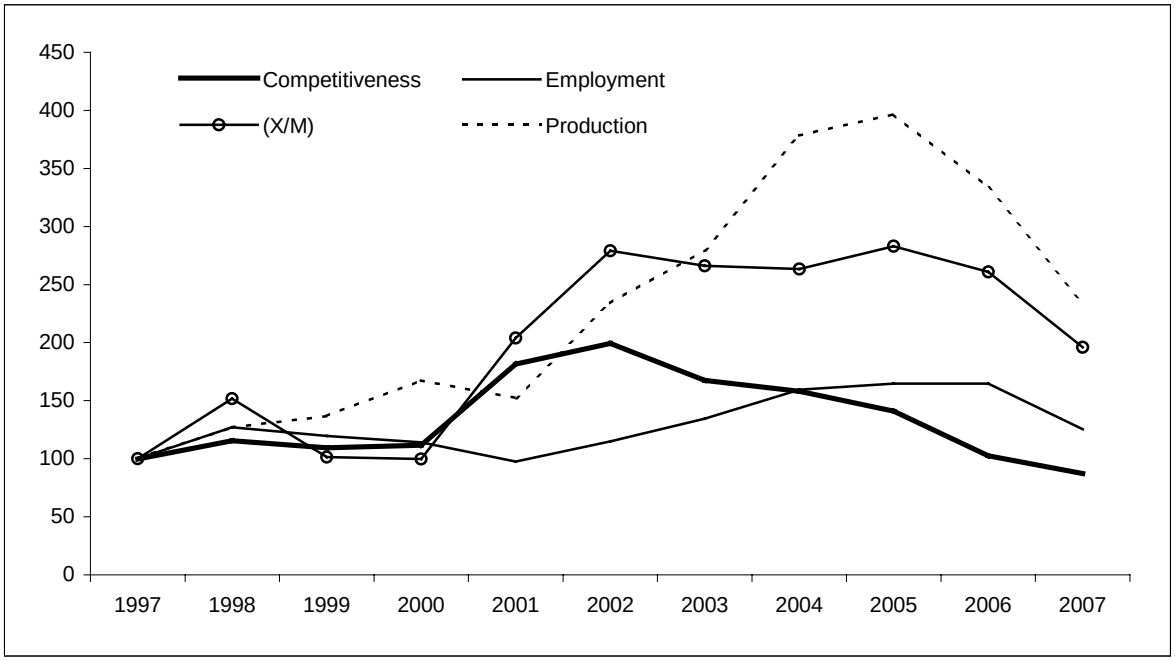
. *Margins declined and the trade balance and the employment level deteriorated.*
. *Turkish electronic industry's dependence on imported inputs (notably in micro-components and flat screens), which was a cost advantage under real currency appreciation, apparently became also a source of technological handicap in this rapidly changing industry.*

C) Sources of extended EPMI

Percentage change in total unit costs based competitiveness and estimated contributions of prices, unit labour costs, unit capital costs, unit energy costs, unit imported costs



D) Trade balance and employment (1997=100)

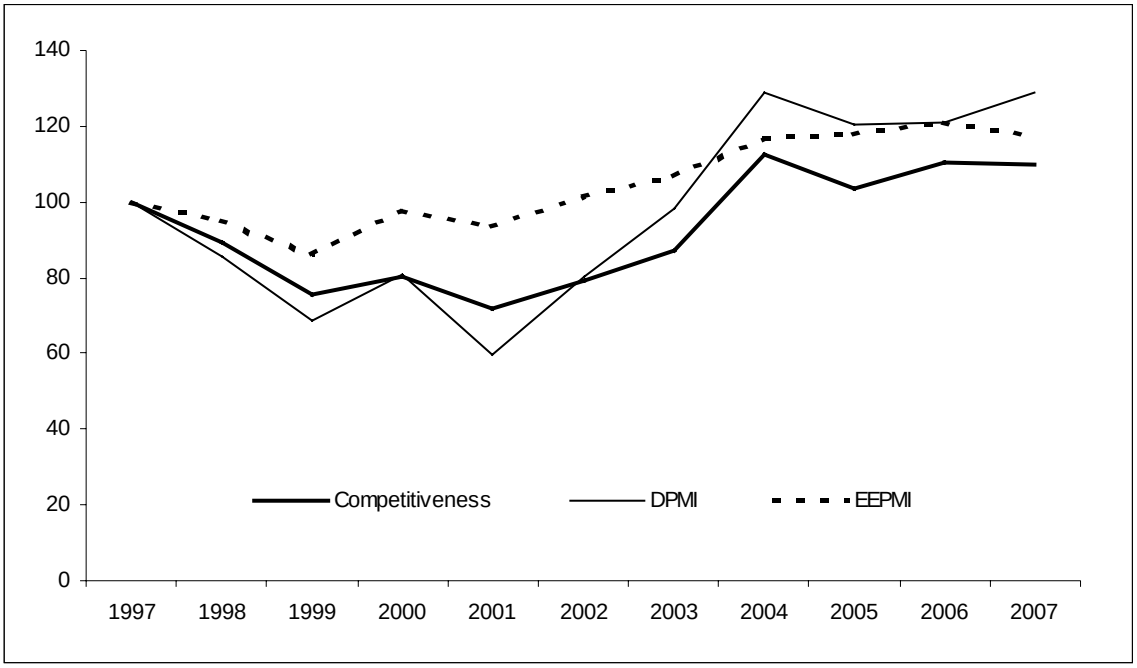


4.14 Car manufacturing

. This industry is the prominent example of Turkey's shift to medium-technology manufacturing. Turkey has become a major international production site in the sector and a major exporter to the European market.

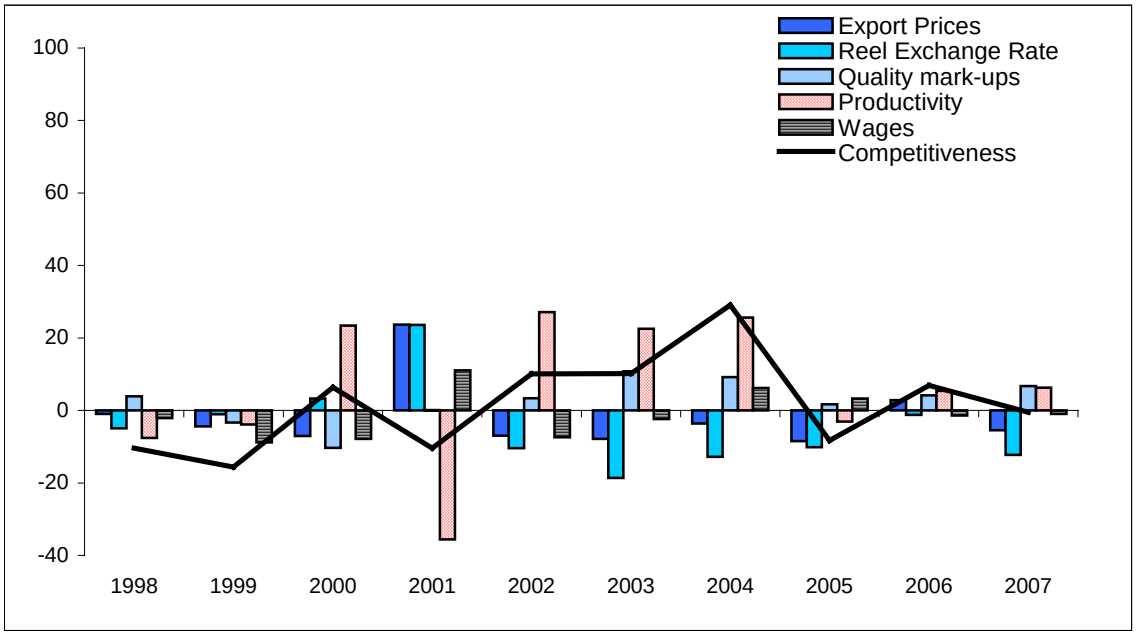
. Both productivity and quality gains have been spectacular. Foreign direct investment has been a major driver of progress in both fronts.

A) Competitiveness (1997=100)



B) Sources of EPMI

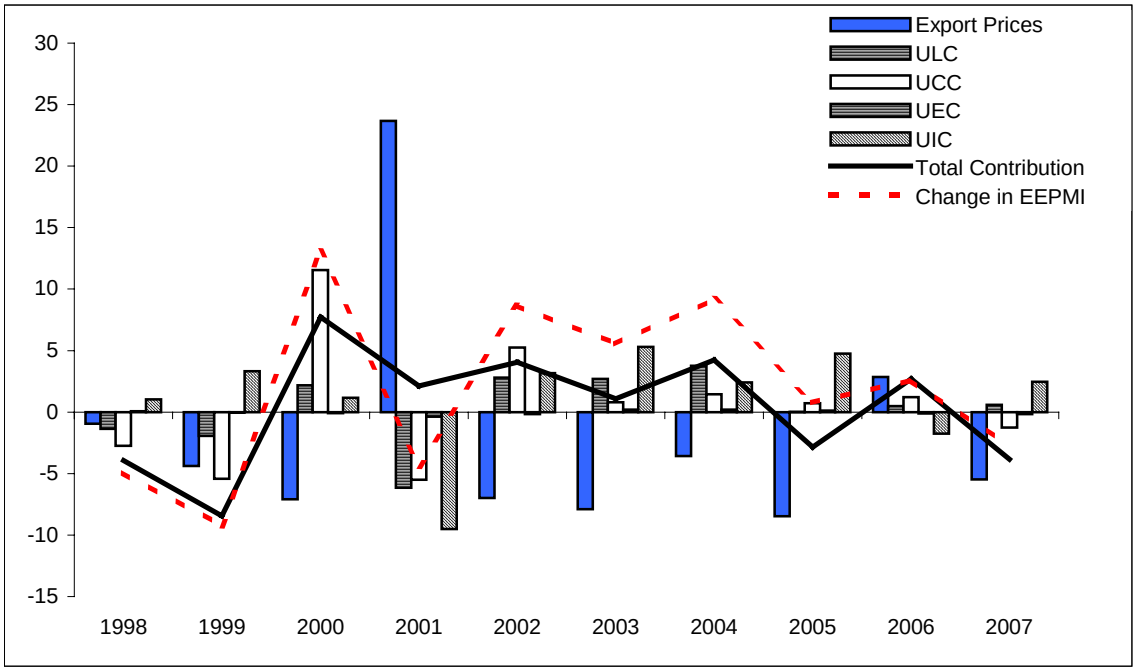
Percentage change in unit labour cost based competitiveness and estimated contributions of prices, real exchange rate, quality mark-ups, productivity and wages



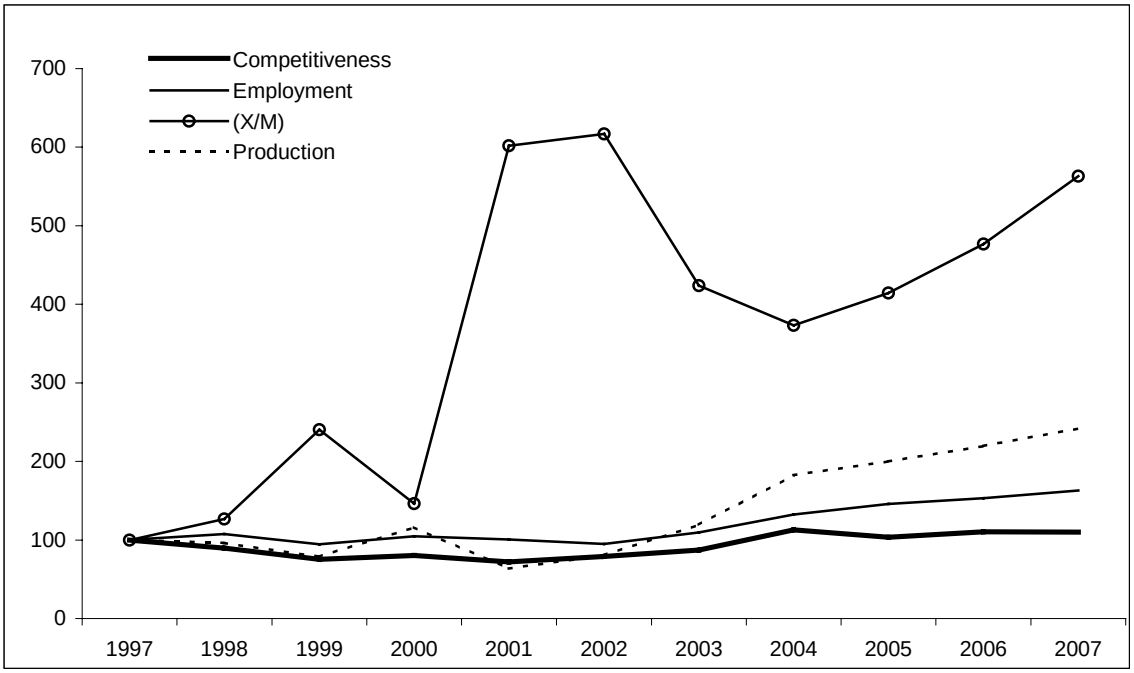
. *Component and equipment suppliers also grew strongly and created many jobs.*
. *The decline of imported input costs contributed importantly to competitiveness.*

C) Sources of extended EPMI

Percentage change in total unit costs based competitiveness and estimated contributions of prices, unit labour costs, unit capital costs, unit energy costs, unit imported costs



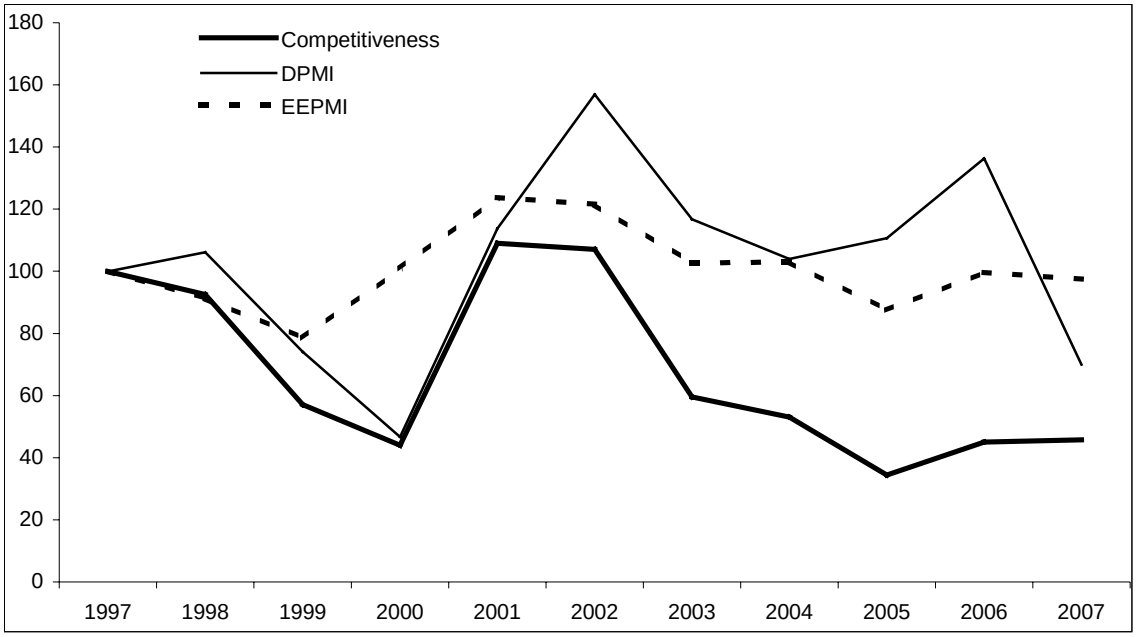
D) Trade balance and employment (1997=100)



4.15 Other transportation equipment (shipbuilding)

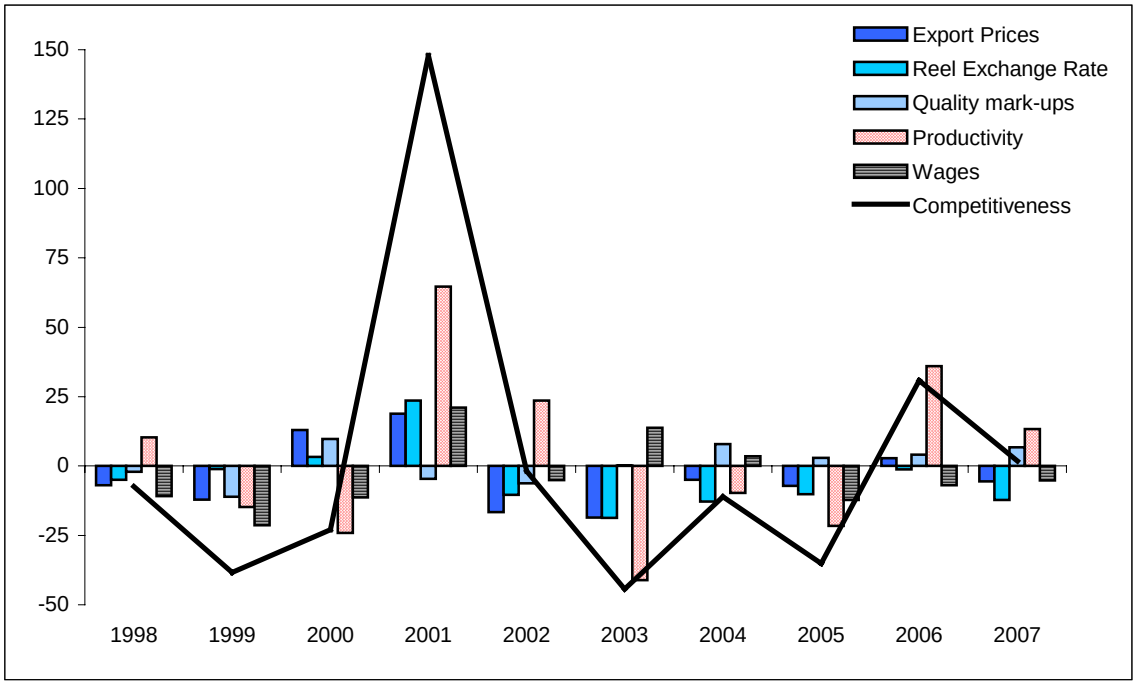
. The "other transportation equipment" sector is centered on shipbuilding. Shipbuilders achieved remarkable output growth in the 2000s and penetrated international markets.
. Very strong international demand helped.

A) Competitiveness (1997=100)



B) Sources of EPMI

Percentage change in unit labour cost based competitiveness and estimated contributions of prices, real exchange rate, quality mark-ups, productivity and wages

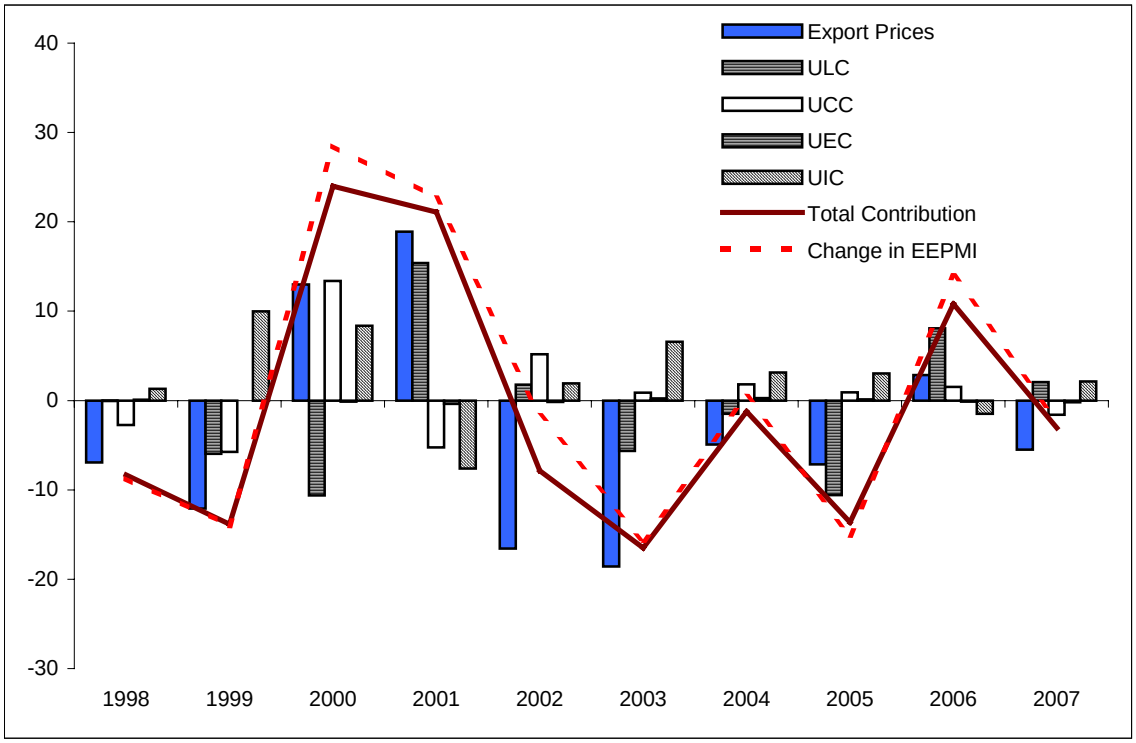


. Margins in the domestic market were recently squeezed under foreign competition. At the same time national builders carved out profitable international niches -- such as in medium-sized commercial ships and high-quality leisure yachts-- and improved their export margins.

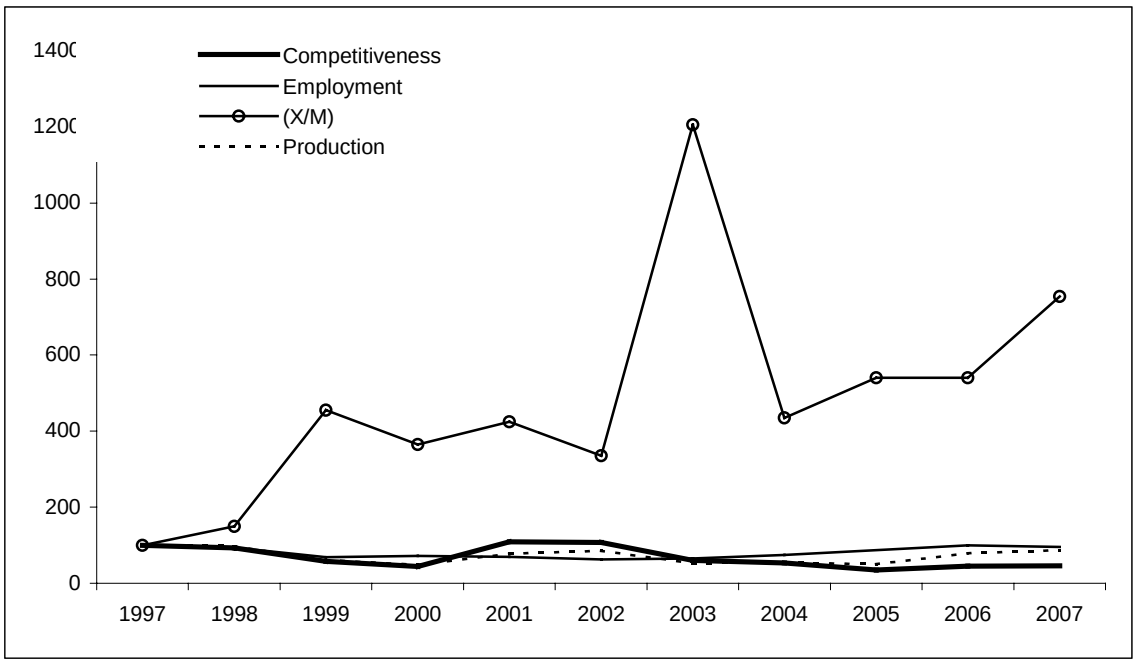
. Employment improved (even if job creation may be stronger in reality due to large recourse to sub-contracting).

C) Sources of extended EPMI

Percentage change in total unit costs based competitiveness and estimated contributions of prices, unit labour costs, unit capital costs, unit energy costs, unit imported costs



D) Trade balance and employment (1997=100)



5. Conclusion

This study examines how Turkish manufacturing industry responded to increased competitive pressures that it has faced over the past decade. Pressures arose both from growing trade competition from low-cost countries which have similar trade specialisation patterns to Turkey's, and from strong trend real currency appreciation that Turkey has experienced during this period.

In response, Turkish manufacturers increased their productivity, differentiated products, moderated wage growth and drew on declining capital and imported input costs. The study provides a detailed statistical analysis of these avenues of response, and the contribution they brought to the competitive margins of the manufacturing industry.

It shows that while the structurally strong sectors of the economy made successful use of these avenues, the less sophisticated and lower-technology activities using low-skilled labour and low-price local inputs could not fully cope, and lost ground. The latter sectors' still large weight in total manufacturing output and employment makes their adjustment a persisting challenge for the Turkish economy.

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